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IN THE

Supreme Court of the United States

OCTOBER TERM, 1995

EXXON CHEMICAL PATENTS, INC.,
EXXON CORPORATION, AND
EXXON RESEARCH AND ENGINEERING CO.,

Petitioners,

v.

LUBRIZOL CORPORATION,

Respondent.

Petition for a Writ of Certiorari to the United States Court of Appeals for the Federal Circuit

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APPENDIX

Charles Alan Wright
727 East 26th Street
Austin, TX 78705
(512) 471-7188

E. Edward Bruce*
Robert A. Long, Jr.
John F. Duffy
COVINGTON & BURLING
1201 Pennsylvania Avenue, N.W.
P.O. Box 7566
Washington, DC 20044
(202) 662-6000

Counsel for Petitioners

* Counsel of Record

May 1996

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United States Court of Appeals for the Federal Circuit

93-1275, 94-1309

EXXON CHEMICAL PATENTS, INC., EXXON CORPORATION and EXXON RESEARCH AND ENGINEERING CO.,

Plaintiffs-Appellees,

v.

LUBRIZOL CORPORATION,

Defendant-Appellant.

DECIDED: September 1, 1995

Before Nies, Plager, and Clevenger, *Circuit Judges*.

Opinion for the court filed by Circuit Judge CLEVENGER, with whom Circuit Judge PLAGER joins. Concurring opinion filed by Circuit Judge Plager. Dissenting opinion filed by Circuit Judge Nies.

CLEVENGER, *Circuit Judge*.

Lubrizol Corporation (Lubrizol) appeals the February 5, 1993 judgment of the United States District Court for the Southern District of Texas, Houston Division, *inter alia* holding that U.S. Patent No. 4,867,890 assigned to Exxon Chemical Patents, Inc. (Exxon) is not invalid under 35 U.S.C. § 102 or § 103 (1988) and is enforceable, and that Lubrizol willfully infringed the claims of the '890 patent. We reverse

the judgment of infringement.[1] We vacate the award of attorneys' fees and costs to Exxon, the injunction entered against Lubrizol, and the damage award entered on February 15, 1994.

I

After extensive discovery, this patent infringement case was tried to a jury. Following the jury's verdict of willful infringement, the judge concluded that the case was exceptional under 35 U.S.C. § 285 (1988) and awarded Exxon its attorneys' fees and costs. Lubrizol's post trial motion for judgment as a matter of law or for a new trial was denied by the judge, and Lubrizol timely brought this appeal. We have jurisdiction under 28 U.S.C. § 1295(a)(1) (1988).

The central issue in this appeal is claim interpretation. Exxon's claims are to a lubricating oil composition suitable for use as a crankcase lubricant in internal combustion engines. The claimed composition is defined as comprising — meaning containing at least — five specific ingredients. Exxon contends that its patent claims a "recipe" of ingredients that extends to any product made by using the claimed ingredients, even if the product itself — as a result of chemical complexing — fails to include one of the claimed

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[1] The judgment is limited to literal infringement of Exxon's claims. The jury was charged solely with respect to literal infringement, directly or by inducement or contribution, and whether such literal infringement was willful. Although Exxon initially proposed a jury charge on infringement under the doctrine of equivalents, its counsel consented to the deletion of the doctrine of equivalents from the infringement charge given to the jury. Lubrizol's brief notes that "Exxon asserted only literal infringement", and Exxon does not contest that statement. The dissenting opinion raises a question of whether Exxon is now entitled to a jury trial on infringement under the doctrine of equivalents. That issue was not briefed or argued to the panel, and consequently we, unlike Judge Nies, express no view on that question.

ingredients. Lubrizol argues that since Exxon claims a composition *product* — not a process for making a product or a product made by a claimed process — the '890 patent only extends to final products that include the specified claimed ingredients.

The trial judge, candidly expressing considerable difficulty in understanding the chemistry and law involved in the case, treated the issue of claim interpretation as a matter of deciding which of the two parties offered the correct meaning of the claims. The jury was charged according to Exxon's preferred claim interpretation.

The duty of the trial judge is to determine the meaning of the claims at issue, and to instruct the jury accordingly. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970 (Fed. Cir. 1995). In the exercise of that duty, the trial judge has an independent obligation to determine the meaning of the claims, notwithstanding the views asserted by the adversary parties. The pursuit of that obligation in this case would have resulted in a determination that Exxon's preferred claim interpretation is incorrect, and that Lubrizol's is only partly correct. As we explained below, under a jury charge stating the correct interpretation of the claims, no jury could reasonably have found — on the evidence submitted by Exxon — that Lubrizol's accused products literally infringe Exxon's claims. Because of Exxon's failure of proof, Lubrizol is entitled to judgment as a matter of law. *See Zenith Labs., Inc. v. Bristol-Myers Squibb Co.*, 19 F.3d 1418, 1424, 30 USPQ2d 1285, 1290 (Fed. Cir. 1994). Accordingly, we reverse the final judgment on liability entered on the jury verdict and vacate the order awarding attorneys' fees and costs and the injunction entered against Lubrizol. The judgment of the District Court which is the subject of Lubrizol's

companion appeal challenging the award of damages is vacated.[2]

II

Exxon and Lubrizol manufacture crankcase lubricating oil compositions and concentrate compositions which are mixed with oil basestock to produce lubricating oils for motor vehicle engines. Such products typically contain the following components as additives: (1) a dispersant, which suspends impurities to prevent sludge and varnish deposits on engine parts, (2) ZDDP, a zinc-containing compound that inhibits engine wear and produces antioxidant results for the oil, (3) a detergent, which helps prevent engine deposits, and (4) a supplemental antioxidant, necessary because use of ZDDP is limited by environmental concerns. Oxidation of the oil component substantially shortens the life of lubricating oils. Oxidation results in increased acidity of the lubricant, which can enhance corrosion of engine parts and increases viscosity of the product, thereby degrading its lubricant qualities.

Exxon's '890 patent seeks enhanced antioxidant results by the addition of a small amount of copper as the supplemental antioxidant to the other typical ingredients of the product. The prosecution history of Exxon's patent emphasized the beneficial synergistic effects caused by the added copper when in the presence of an ashless dispersant.

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[2] The issue of damages was reserved for trial after the trial on liability. The damage award against Lubrizol entered on February 15, 1994, is appealed in No. 94-1309, oral argument in which was heard on March 8, 1995. We have consolidated the appeal in No. 94-1309 with the appeal in No. 93-1275. In light of our reversal of the liability judgment against Lubrizol, no basis remains for a damage judgment against Lubrizol, and we therefore vacate the damage judgment entered in this case.

III

We have recently concluded in banc that claim interpretation is a matter of law, and that the trial judge alone has the duty and responsibility to interpret the claims at issue. *Markman*, 52 F.3d at 970. After close of the evidence in this case, the judge heard argument from the parties on the meaning of Exxon's claims. During that argument, Lubrizol argued that the meaning of the claims should be left to the jury for decision, if the court failed to agree with Lubrizol's preferred claim interpretation. The judge correctly refused to submit the issue to the jury, and instead decided which of the two proffered interpretations seemed most correct. It may well be that in some cases one side or the other will offer the correct claim interpretation to the judge. More often, however, it is likely that the adversaries will offer claim interpretations arguably consistent with the claims, the specification and the prosecution history that produce victory for their side. In any event, the judge's task is not to decide which of the adversaries is correct. Instead the judge must independently assess the claims, the specification, and if necessary the prosecution history, and relevant extrinsic evidence, and declare the meaning of the claims. No matter when or how a judge performs the *Markman* task, on appeal we review the issue of claim interpretation independently without deference to the trial judge.

IV

Representative of the claims of the '890 patent, claim 1 is directed to "[a] lubricating oil composition suitable as a crankcase lubricant in internal combustion engines comprising" (1) a major amount of lubricating oil, (2) an ashless dispersant (*i.e.* one that neither contains nor is complexed with metal) in specified amounts of "about 1 to 10 wt. %", (3) from about 0.01 to 5.0 parts by weight of oil soluble ZDDP, (4) 5 to 500 parts per million by weight of

added copper in the form of an oil soluble copper compound, and (5) magnesium or calcium detergent.[3]

The subject of claim interpretation was argued to the judge at the close of Exxon's case and was considered again in extensive argument at the close of all the evidence. At the conclusion of the arguments, the judge decided that Exxon was correct in its view of the claims' meaning. The parties did not contend that the claims of the '890 patent are process claims drawn to a specified manner of manufacture, and the claims as written could not have such meaning. Nor are the claims said to be, or could they be, product-by-process claims. The claims of the '890 patent are drawn to a particular composition: they are product claims. According to Exxon, its claims cover any product that is made by using the specific ingredients identified in the limitations of claim 1.[4] During the trial, Exxon's claims were thus said to be to a "recipe" for

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[3] The full text of claim 1 is set forth in the appendix to this opinion. Claim 61 of the '890 patent is drawn to a lubricating oil concentrate composition suitable for use in preparing crankcase lubricants. That claim, like claim 1, has specific quantity limitations for the ingredients, including the ashless dispersant ingredient. However, claim 61 does not require a "major amount" of lubricating oil (it requires "a lubricating oil," without specific amount), and it requires 10 to 60 wt. of ashless dispersant. Both claims were submitted to the jury.

[4] If the claim is defined solely by the starting ingredients, a product actually containing all the specified ingredients would seem to escape at least literal infringement if produced by the combination of different ingredients. Such is at odds with the doctrine that a product claim is infringed by any product containing every claim limitation, regardless of how the product is made. *See Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1535, 19 USPQ2d 1367, 1369 (Fed. Cir. 1991); *see also* 2 Donald S. Chisum, *Patents* § 8.05, at 8-79 (1994) (collecting cases). Under Exxon's view, its claims also would seem not to reach a product made with a nonashless dispersant starting ingredient that is somehow rendered ashless during manufacture, if such a rendering is chemically possible.

making the composition. Whether the specified ingredients could be found in the actual composition produced by mixing the ingredients is, according to Exxon, simply irrelevant to the meaning of the claims. To emphasize this point, Exxon's counsel stated — both to the trial judge and this court — that Exxon's claims will cover a composition that has the added copper regardless of whether any ashless dispersant can be found in the mixture. In short, in Exxon's view the claimed "recipe" for making the claimed product *is* the claimed product.

The trial judge charged the jury accordingly:

> I instruct you that Exxon's claims cover the ingredients which go into the composition. If you find that Exxon has proved that a Lubrizol product is made by using the starting ingredients in the amounts called for in one or more of Exxon's claims, then that product directly infringes.

The issue of claim interpretation has been raised first by Lubrizol in its motion for a directed verdict at the close of Exxon's case, which the judge denied. The issue was raised again by Lubrizol's motion for judgment as a matter of law at the close of all the evidence, also denied by the judge. The charge to the jury on claim interpretation was also challenged by Lubrizol, both before the case was submitted to the jury and by the post trial motion for judgment as a matter of law.

As noted above, Exxon's claims are drawn to a specific product which has particularly defined ingredients. Nothing in the claims, the specification, or the prosecution history suggests that Exxon's claims are not drawn to a product that contains particular ingredients. Indeed, to the contrary, the title to the '890 patent reads, with the emphasis added, "Lubricating Oil Compositions *Containing* Ashless Dispersant, [ZDDP], Metal Detergent and a Copper Compound". *See Titanium Metals Corp. of Am. v. Banner*, 778 F.2d 775, 780,

227 USPQ 773, 777-78 (Fed Cir. 1985) (referring to patent's title as interpretative aid). The language of claim 1 refers to "added" copper and to a detergent "additive." The specification demonstrates that those claim references aim at a chemical composition to which ingredients are being introduced. We must give meaning to all the words in Exxon's claims. *In re Sabatino*, 480 F.2d 911, 913, 178 USPQ 357, 358 (CCPA 1973) ("Claim limitations defining the subject matter of the invention are never disregarded.") In addition, the text of the '890 specification includes over twenty references to "containing" in reference to the ingredients claimed in the composition. Furthermore, during prosecution of the applications that resulted in the '890 patent, Exxon repeatedly emphasized that the genius of its invention lay "in the *previously unknown* synergism of this material [copper] with ZDDP in the presence of an ashless dispersant of the type described in the application...."

In sum, a review of the claims, the specification, and the prosecution history all point to the conclusion that Exxon claims a product, not merely a recipe for making whatever product results from the use of the recipe ingredients. This conclusion respects that which is claimed, namely a chemical composition. The chemical composition exists at the moment the ingredients are mixed together. Before creation of the mixture, the ingredients exist independently. The particular proportions specified in the claims simply define the characteristics of the claimed composition.

Under Lubrizol's view of the claims, as asserted at trial and on appeal, the composition claimed by Exxon is limited to the final product made and ready for use in the engine environment. Lubrizol is correct that the claims read on a product, not simply a recipe, but Lubrizol errs in thinking that the claims read only on end product compositions. Lubrizol thus asserts a claim meaning that depends upon the time at which one views the composition claimed. The specification

as a whole, and the claims in particular, contain no temporal limitation to the term "composition." Indeed, claim 61 reads on a concentrate for preparing lubricants, which is hardly a product ready for consumer end use. The composition of claim 1, once its ingredients are mixed, is a composition existing during manufacture that is being used to produce the end product. Consequently, as properly interpreted, Exxon's claims are to a composition that contains the specified ingredients at any time from the moment at which the ingredients are mixed together. This interpretation of Exxon's claims preserves their identity as product claims, and recognizes as a matter of chemistry that the composition exists from the moment created. Although Lubrizol is correct in taking Exxon's claims to read on a product, its interpretation of Exxon's claims is too narrow. Exxon is entitled to a broader scope that is not time-limited, one that reads on any product at any time that contains the claimed proportions of ingredients. The correct interpretation simply affords Exxon a wider range of product on which to assert infringement. Indeed, Exxon even took advantage of the correct interpretation during trial. When defending its case under Lubrizol's claim interpretation, Exxon did not introduce evidence that Lubrizol's final product infringed. Instead of offering evidence that analyzed the components of Lubrizol's final product, Exxon's witnesses testified to the reaction that occurs when the Lubrizol product is in the process of being made into the final product. According to Exxon's witnesses, that reaction did not result in complete elimination of ashless dispersant in the product. Exxon thus did not focus on Lubrizol's final product to prove infringement. Exxon adopted the broader view and described the infringing activity as occurring while the claimed ingredients were undergoing chemical reactions, necessarily a time before the final product, ready for sale, exists.

We thus hold that the judge erred as a matter of law in giving Exxon's preferred claim interpretation to the jury, and in using that interpretation in ruling on Lubrizol's post trial motion. Under the proper charge, the jury would not have been asked if Lubrizol used Exxon's starting ingredients. Instead, the jury would have been asked to find whether Exxon had proved by a preponderance of the evidence that Lubrizol's products at some time contained each of the claimed recipe ingredients in the amounts specifically claimed.

V

Given the correct interpretation of Exxon's claims, the dispositive question before us is whether any jury could reasonably have found that Lubrizol's accused products literally infringe the claims of the '890 patent as properly construed. *Jamesbury Corp. v. Litton Indus. Prods.*, 756 F.2d 1556, 1560-61, 225 USPQ 253, 257 (Fed. Cir. 1985). Our authority to decide this question has been explicitly stated by the Supreme Court:

> If the evidence presented in the first trial would not suffice, as a matter of law, to support a jury verdict under the properly formulated defense, judgment could properly be entered for the respondent at once, without a new trial. And that is so even though (as petitioner claims) respondent failed to object to jury instructions that expressed the defense differently, and in a fashion that would support a verdict.

Boyle v. United Technologies Corp., 487 U.S. 500, 513-514 (1988). Lubrizol thus may be entitled to judgment as a matter of law. *Id.* "The question of whether the evidence is sufficient to create an issue of fact for the jury is itself a question of law, which we will now decide." *Jamesbury*, 756 F.2d 1560, 225 USPQ at 257. Literal infringement requires that every limitation in Exxon's claims be found in the accused product. *Laitram*, 939 F.2d at 1535, 19 USPQ2d at

1369. Exxon's burden is thus to prove by a preponderance of the evidence, among other things, that Lubrizol's products contained at some time ashless dispersant in the amounts specifically claimed.

From the beginning of the trial, Exxon was on notice that Lubrizol's view of claim interpretation required Exxon to prove that Lubrizol's products contained ashless dispersant in the amounts specified. Exxon was also aware from discovery that Lubrizol would defend against the charge of infringement by proof that its products as manufactured contained no ashless dispersant. Exxon thus had the choice of simply proving infringement under *its* view of the claims, or in addition proving infringement under Lubrizol's view as well. Exxon chose to do both. Lubrizol's defense on its view of the claims is based on its evidence that, when one mixes the ingredients specified in Exxon's claims, (1) the soluble copper compound reacts with ZDDP to form a zinc compound and CuDDP and (2) zinc then bonds to the formerly ashless dispersant to render it non-ashless, inasmuch as, after the reaction, it is complexed with a metal. According to Lubrizol, the reactions are immediate and the bond formed between the dispersant and zinc is firm, and as a result, its product lacks the ashless dispersant specified as a necessary ingredient in Exxon's claims.

At trial, Exxon sought to prove its case, under Lubrizol's claim interpretation, with testimony that the bond formed between the zinc and the dispersant was a weak one. The bond was described as unstable, with the molecules bonding, unbonding and rebonding constantly. The process was described variously as analogous to square dance with partners swapping around, to hand-holding and unholding, and to hats being taken on and off. The bonding and unbonding, also described as a "dynamic equilibrium," occurs an infinite number of times. According to Exxon, the weak bond — with its constant reversal and rebonding — proved that

Lubrizol's dispersant was not always nonashless, and therefore sometimes ashless. Exxon's proof was supplied by expert opinion and did not include any scientific measurements resulting from tests of Lubrizol's accused products. Exxon's proof did not relate to infringement by Lubrizol's *final* products. Instead, its proof was aimed at the presence of ashless dispersant during manufacture of the end product.

Lubrizol's expert witnesses countered with their opinion that the bond created between the zinc and the dispersant was a strong complex, and that the dispersant remained non-ashless 99.999% of the time. The testimony of Lubrizol's witnesses relied on nuclear magnetic resonance tests performed by Lubrizol on its products, and concluded that there is no ashless dispersant in Lubrizol's accused products after blending their starting ingredients.

We may assume for purposes of this appeal that a jury hearing such evidence could reasonably have concluded that — at some time — during the manufacture of the product or in its manufactured state — ashless dispersant is found in Lubrizol's product.[5] That assumption, however, is not dispositive of Lubrizol's post trial motion for judgment as a matter of law. It is not enough for Exxon to prove that *some* of the dispersant in Lubrizol's product is ashless even if

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[5] On the record before this court, it is not clear that the trial judge meant for the jury to consider the testimony about the nature of the bond between the zinc and the ashless dispersant. In discussions with counsel, the judge stated clearly that he would charge the jury as Exxon wanted, and under Exxon's view of the claims what "happens in the pot" during or after manufacture of the composition, and Lubrizol's nuclear magnetic resonance evidence, is simply irrelevant. Under the claim interpretation charge given, there was no reason for the jury to consider the evidence of both parties going to whether Lubrizol infringes under its view of the claims. To find infringement as charged, all the jury had to find is that Lubrizol used Exxon's claimed starting ingredients in the amount claimed, an essentially uncontested fact.

momentarily. Lubrizol's motion is only thwarted if Exxon has supplied testimony from which a reasonable jury could conclude that Lubrizol's products contain ashless dispersant in the specific amounts claimed. Exxon offered no testimony on the amounts of ashless dispersant present *in* Lubrizol's products. Nor did Exxon provide the jury with direct evidence from which it could have inferred that the required percentages are found in the composition after it is created out of its specified starting ingredients. In its briefs to this court, Lubrizol emphasized Exxon's failure of proof with regard to the quantities of the ingredients contained in the accused products. Exxon did not respond with assertions that the record included proofs of the *quantities* of ingredients present in the accused products. Instead, Exxon argued only that "Lubrizol started with the requisite amount of ashless dispersant and, even under its theory, ashless dispersant is still present in Lubrizol's final product, albeit in ever-changing form." In order to prevail under properly interpreted claims, Exxon was obliged to prove both the presence of ashless dispersant and presence of the required quantity. Exxon's failure as to the latter requires us to conclude as a matter of law in Lubrizol's favor.

Post-trial motion practice entails, *inter alia*, ascertainment of whether correct law has been applied to the facts presented at trial in reaching a verdict or judgment. When a trial judge determines on a post-verdict motion what the law correctly is, the judge then determines whether any juror could reasonably have reached — on the evidence presented at trial — the verdict challenged by the post-verdict motion. If the answer is no, the trial judge reverses the jury verdict for failure of proof on the correct legal standard, and denies the loser a second trial on the correct law. That is what happened at trial in *Markman*, and we affirmed that disposition *in banc*, 52 F.3d 967, 989.

When we determined on appeal, as a matter of law, that a trial judge has misinterpreted a patent claim, we independently construe the claim to determine its correct meaning, and then determine if the facts presented at trial can support the appealed judgment. If not, we reverse the judgment below without remand for a second trial on the correct law. That is what we did to the bench trial in *Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1539 (Fed. Cir. 1991), citing as support the very language from the Supreme Court decision in *Boyle* that we rely upon herein to deny Exxon the second trial that Judge Nies would provide. We ordinarily do the same thing in the appellate review of jury trial cases, typically explaining our duty as follows:

> Accordingly, we must determine whether there exists evidence of record upon which a jury might properly have returned a verdict in Litton's favor when the correct legal standard is applied. If there is not, Jamesbury was entitled to have the question removed from the jury and decided as a matter of law.

Jamesbury Corp. v. Litton Indus. Prods., Inc., 756 F.2d 1556, 1560 (Fed. Cir. 1985). *See also Dana Corp. v. IPC Ltd. Partnership*, 860 F.2d 415, 419 (Fed Cir. 1988). Such judicial events are not extraordinary.

On the facts of this case, we perceive no reason to deviate from, or reject, the settled law that compels reversal. The correct meaning of Exxon's claims is but a slight variance from that urged vigorously and continuously by Lubrizol. That Lubrizol sought to hold Exxon to proof of infringement of *product* claims hardly comes, or came, out of the blue. Exxon was fully aware that Lubrizol stood on a claim meaning that would require Exxon to prove the presence of specified amounts of claimed ingredients in *some* Lubrizol product. In fact, Exxon attempted to prove infringement under the interpretation we give to its claims. We have noted that

Exxon chose not to introduce proofs of the contents of Lubrizol's *final* products. Rather, its proof of the presence of some ashless dispersant, evidence that we credit in testing the denial of the post verdict motion, relates to product in pre-final states. Nothing precluded Exxon from arguing and seeking to prove that *a* Lubrizol product, at some time after its creation, contained the specified ingredients in the claimed amounts. We have emphasized that Exxon's error was in failure of proof as to the claimed amounts, without which it could not prove infringement under Lubrizol's claim meaning. The trial judge did not interpret the claims until all the evidence was in, just before the case was submitted to the jury. Exxon — knowing Lubrizol's defense — knew that it would lose on Lubrizol's claim meaning unless it could show the presence of the claimed ingredients in the claimed amounts in some Lubrizol product. Exxon was free to choose the amount at which it would identify with proof that a Lubrizol product infringed. Thus, Exxon could have argued and sought to prove that ashless dispersant is present in the claimed percentages, along with the other claimed ingredients in their specified amounts, at any time from the moment of creation of Lubrizol's product. Exxon cannot now claim surprise from our variation on Lubrizol's claim meaning and cry foul in not having a second chance to prove what it was free to prove at trial. Consequently, on the facts of this case, we discern no reason to carve an exception into the settled law in order to provide Exxon an opportunity to escape from the flaws in its claim drafting (as described in Judge Plager's concurring opinion) and trial strategy. We therefore disagree with Judge Nies's view that our reversal without remand for a second trial is improper.[6]

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[6] *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565 (Fed. Cir. 1986), and *Malta v. Schulmerich Carillons, Inc.*, 952 F.2d 1320 (Fed. Cir. 1991), do not stand in the way of our decision. Each case

raised the question whether a party seeking to upset a jury verdict on a post verdict motion had failed to preserve the ground for the post verdict motion by failing to specify that ground in earlier directed verdict motions. In *Orthokinetics*, the specific question was whether a motion for directed verdict of simply non-infringement embraced a later post verdict motion seeking to upset a jury verdict of willful infringement. The trial court had granted the motion, holding the evidence insufficient to support a jury verdict of willful infringement. This court concluded that the movant had failed to preserve the issue of willful infringement for the post verdict motion. 806 F.2d at 1579. This court, however, did not reverse the grant of the post verdict motion for failure to have preserved its ground. Indeed, this court did not conclude that the district court was even required to reject the post verdict motion. We only noted that the "district court might well have refused consideration of willfulness on the motion for JNOV in light of Rule 50(b)." *Id.* at 1580. Dispositively, this court held the ruling on the post verdict motion ripe for appellate review because the non-movant had not objected to the grounds stated in the post verdict motion.

It is difficult to understand how *Orthokinetics* in Judge Nies's hands helps the cause she advocates for Exxon. This is so because *Orthokinetics* teaches that even a legally insufficient post verdict motion may be acted upon by the trial judge with that action preserved for appellate review, if the non-movant has not objected to the content of the post verdict motion. We note, in passing, that Exxon did not object to the content of Lubrizol's post verdict motion.

Malta sheds interesting light on what can be devined from *Orthokinetics*. In *Malta*, the question was whether a barebones motion for directed verdict, at the close of all the evidence, of noninfringement "on the grounds that the evidence is insufficient." 952 F.2d at 1324, was sufficient to support a post verdict motion challenging the verdict of infringement under the doctrine of equivalents for lack of "particularized function/way/result testimony and linking argument." *Id.* at 1325. This court concluded that the earlier general motion of noninfringement embraced all the particular arguments in support of the post verdict motion. In the light of *Malta*, we cannot fault the failure of Lubrizol, in its post verdict motion, to have argued that Exxon could prove infringement under Lubrizol's theory by proving not only that Lubrizol's *final* product infringed, but that *any* product made by Lubrizol that existed after the moment of creation also could infringe. Indeed, the spread between the general and the specific in *Malta* is enormous, compared to the

Because Lubrizol is entitled to a judgment of noninfringement as a matter of law and thus to vacation of the order awarding Exxon its attorneys' fees and costs and of the injunction entered against Lubrizol, we need not reach the other grounds asserted by Lubrizol for reversal of the judgment of infringement or in the alternative for a new trial. Because there is no basis for a damage award against Lubrizol, we vacate the damage award in appeal No. 94-1309.

No costs.

REVERSED

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distance between the meaning we give Exxon's claims on appeal and that advanced by Lubrizol to the trial judge. Lubrizol's view of the claims is less generous to Exxon than ours. If only Lubrizol's *final* product could infringe Exxon's claims, Exxon's proofs fail completely since it produced no evidence of the content of any Lubrizol *final* product. Only under the interpretation we give Exxon's claims does Exxon's evidence of infringement of a product claim have any relevance. This is so because the only evidence Exxon put on to show the presence of ashless dispersant in a Lubrizol product was evidence of the reaction that occurs during the manufacture of the Lubrizol final product. This evidence was offered when Exxon did not know if the trial court would accept its, or Lubrizol's proffered claim interpretation. Exxon thus focussed on a product of Lubrizol that was not its final product, but, as we have noted, Exxon fell short of demonstrating that the ashless dispersant, when present, was present in the claimed amounts.

APPENDIX

Claim 1 of the '890 patent reads as follows:

1. A lubricating oil composition suitable as a crankcase lubricant in internal combustion engines comprising:

A. a major amount of lubricating oil;

B. a dispersing amount of lubricating oil dispersant selected from the group consisting of:

(1) ashless nitrogen or ester containing dispersant compounds selected from the group consisting of:

(a) oil soluble salts, amides, imides, oxazolines, esters, and mixtures thereof, of long chain hydrocarbon substituted mono- and dicarboxylic acids or their anhydrides;

(b) long chain aliphatic hydrocarbons having a polyamine attached directly thereto; and

(c) Mannich condensation products formed by condensing about a molar proportion of long chain hydrocarbon substituted phenol with from about 1 to 2.5 moles of formaldehyde and from about 0.5 to 2 moles of polyalkylene polyamine; wherein said long chain hydrocarbon group is a polymer of a C_2 to C_5 monoolefin, said polymer having a molecular weight of from about 700 to about 5000;

(2) nitrogen or ester containing polymeric viscosity index improver dispersants which are selected from the group consisting of:

(a) polymers comprised of C_4 to C_{24} unsaturated esters of vinyl alcohol or of C_3 to C_{10} unsaturated mono- or dicarboxylic acid with unsaturated nitrogen containing monomers having 4 to 20 carbons,

(b) copolymers of C_2 to C_{20} olefin with C_3 to C_{10} mono- or dicarboxylic acid neutralized with amine, hydroxy amine or alcohols, and

(c) polymers of ethylene with a C_3 to C_{20} olefin further reacted either by grafting C_4 to C_{20} unsaturated nitrogen containing monomers thereon or by grafting an unsaturated acid onto the polymer backbone and then reacting said carboxylic acid groups with amine, hydroxy amine or alcohol; and

(3) mixtures of (1) and (2); wherein when said lubricating oil dispersant (1) is present, then said dispersing amount of (1) is about 1 to 10 wt. %, and when said lubricating oil dispersant (2) is present, then said dispersing amount of (2) is from about 0.3 to 10 wt. %;

C. from about 0.01 to 5.0 parts by weight of oil soluble zinc dihydrocarbyl dithiophosphate wherein the hydrocarbyl groups contain from 1 to 18 carbon atoms;

D. an antioxidant effective amount, within the range of from about 5 to about 500 parts per million by weight, of added copper in the form of an oil soluble copper compound; and

E. a lubricating oil detergent additive which comprises at least one magnesium or calcium salt of a material selected from the group consisting of sulfonic acids, alkyl

phenols, sulfurized alkyl phenols, alkyl salicylates and naphthenates, wherein said parts by weight are based upon 100 parts by weight of said lubricating composition and said weight % is based on the weight of said lubricating composition.

PLAGER, *Circuit Judge*, concurring.

I join in the reversal of the trial court's judgment of infringement, based on what I consider to be the correct claim interpretation as advanced by Judge Clevenger, and the consequences that flow therefrom.

There is testimony in the record that indicates that it is not known exactly how the chemical complexing, described in the opinion, actually works. If this is so, then Exxon's burden, to prove that the chemical ingredients exist at some point in the accused composition in the claimed proportions, may be impossible of accomplishment. That could be said to argue in favor of an alternative construction of the claims, that what was meant was a process or product-by-process claim.

The difficulty with that argument is that the claims, as the opinion well demonstrates, are unquestionably composition of matter claims. In retrospect, it would appear that Exxon wishes it had product-by-process claims, and thus a "recipe." But we are not free to read the claims as they might have been drafted, even if as drafted they do not accomplish what the inventor may have intended.

Claim drafting is itself an art, an art on which the entire patent system today depends. The language through which claims are expressed is not a nose of wax to be pushed and shoved into a form that pleases and that produces a particular result a court may desire. The public generally, and in particular, the patentee's competitors, are entitled to clear and specific notice of what the inventor claims as his invention. That is not an easy assignment for those who draft claims, but the law requires it, and our duty demands that we enforce the requirement. There is no room in patent claim interpretation for the equivalent of the *cy pres* doctrine; that would leave the claiming process too indefinite to serve the purposes which lie at the heart of the patent system.

NIES, *Circuit Judge*, dissenting.

Contrary to conventional wisdom in the art, Exxon discovered that small amounts of copper in automobile motor oil acts as an antioxidant, and it developed a highly successful commercial product using that discovery. The record discloses that Lubrizol learned of the presence of copper in Exxon's motor oil from Exxon's U.K. patent application and used the disclosure to prepare a competitive product. Both companies now use copper in the vast majority of their passenger car motor oil formulations. Following this phase of the litigation finding Lubrizol liable for infringement of Exxon's U.S. Patent No. 4,867,890, Exxon was awarded $48,000,000 in damages which were doubled for willfulness and $8,700,000 in interest plus $23,700,000 in attorney fees.[1]

The issue of infringement essentially comes down to whether Exxon drafted a claim in its U.S. patent that covers its invention. The majority interprets the claims to require that each of the listed additives to a motor oil must retain its pre-mix identity, to the extent that each must be present in the claimed proportions at some point after mixing. Because Exxon failed to prove that the additives remained identifiable (in those proportions) in Lubrizol's product at some time during or after mixing, the majority reverses the judgment of infringement. I agree with the trial court that Lubrizol infringes. Lubrizol's motor oil contains the required additives in the required amounts. To hold that the final product does not "comprise" those ingredients because of their possible reaction with each other upon mixing seems to me nothing short of double speak. The claims can be interpreted as the majority does only by reading them in isolation from the context of the patent. Moreover, the majority's interpretation

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[1] Appeal No. 94-1309 challenging the amount of damages is mooted by the majority decision.

gratuitously provides grounds for invalidation of the patent under section 112, because the specification does not describe nor enable one skilled in the art to make a product containing the claimed ingredients in the claimed amounts except as starting ingredients, not mixed ingredients.[2]

The majority focuses principally on the claimed "ashless dispersant" which must remain in its view "ashless" in the required amount in the composition. I interpret "ashless dispersant" as simply the name or designation of an ingredient required as one of the additives. It does not mean the ingredient must remain inert.

As stated in *Adams v. United States*, 383 U.S. 39, 49, 148 USPQ 479, 482 (1966), "it is fundamental that claims are to be construed in light of the specifications and both are to be read with a view to ascertaining the invention." Moreover, claims should be "construed, if possible, as to sustain their validity." *North American Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571, 1577, 28 USPQ2d 1333, 1337 (Fed. Cir. 1993).

Applying those precepts warrants an affirmance in this case. My concern is, however, not merely this case. The majority mandates technical rules for how chemical compositions must be claimed which I reject.

I.

Infringement here turns on interpreting claims 1 and 61. Claim 1 is directed to "a lubricating oil composition"

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[2] Paragraph 1 of 35 U.S.C. § 112 (1988) states, in relevant part: "The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains or with which it is most nearly connected, to make and use the same...."

comprising: (a) a major amount of lubricating oil; (b) a specified amount of dispersant (either about 1-10 wt. percent of an ashless dispersant[3] or about 0.3-10 wt. percent of a "polymeric viscosity index improver"[4]); (c) about 0.01 to 5.0 parts by weight of zinc dihydrocarbyl dithiophosphate ("ZDDP"); (d) about 5 to about 500 parts per million by weight of added copper in the form of an oil soluble copper compound; and (e) a calcium or magnesium detergent. Claim 61 claims a "lubricating oil concentrate composition" comprising the same five ingredients in different, specified amounts.

The trial judge interpreted those claims for the jury, instructing them as follows:

> I instruct you that Exxon's claims cover the ingredients which go into the composition. If you find that a Lubrizol product is made by using the starting ingredients in the amounts called for in one or more of Exxon's claims, then that product directly infringes.

Lubrizol argues that that instruction is wrong. It maintains that, regardless of what ingredients are mixed together, there is infringement only if the final lubricant composition contains the five claimed ingredients, in the

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[3] "Ashless" denotes an absence of combined or complexed metal. Lubrizol's Dr. Salomon testified that "it is easier from a manufacturing point of view to manufacture it in the ashless form." She added that "[a]s a formulator, I don't care [if it is ashless or non-ashless in the product] where I have some surprising discovery that affects performance. But it doesn't matter to me.... Typically, most dispersants are made ashless from a manufacturing point of view."

[4] The polymeric viscosity index improver ("PVII") is not at issue here, inasmuch as the challenged Lubrizol products are alleged to use the ashless dispersant, not the PVII. Henceforth, this opinion will not mention PVII.

claimed amounts. Thus, although it is essentially uncontested that Lubrizol adds ashless dispersant and the other claimed ingredients in the claimed amounts to its motor oil, Lubrizol argues that there is no infringement because it was not proved that "ashless" dispersant, in the claimed amount, was present in its *final* products. Specifically, it urges, the ashless dispersant that it uses in admixture with the other ingredients specified in the claims complexes with metal moieties from those ingredients so that the dispersant in the final product can no longer be considered "ashless."

Exxon, on the other hand, urges that the trial judge's instruction reflects the proper claim interpretation that ashless dispersant identifies a starting ingredient, and under that interpretation, it does not matter what complex forms between metal and the dispersant.

The majority opinion interprets the claims somewhere between the interpretations of Exxon and Lubrizol, as covering any mixed product—final or otherwise—in which the five ingredients specified in the claims exist in the claimed amounts. The majority accepts Lubrizol's proof that at least some ashless dispersant is converted to nonashless dispersant during production of Lubrizol's products, and because of that, proving that the required amounts of the five ingredients were mixed is not enough to prove infringement. Consequently, to show infringement, the majority believes that it was Exxon's burden to prove that, at some point during production of Lubrizol's products, the mixing pot contained *the claimed amounts* of "ashless dispersant" and the other four claimed ingredients. And, the majority concludes, Exxon has not introduced enough evidence in the record to meet that burden.

I agree with the trial judge's interpretation of the claims that one skilled in the art, upon reviewing the patent specification, claims, prosecution history, and testimony, would interpret claims 1 and 61 as covering a lubricating oil

composition comprising the product resulting from a combination of the required five ingredients, in the claimed amounts, regardless of any unknown reactions, or metal complexes formed between those ingredients that occurs upon mixing. With that interpretation, literal infringement is admitted.

A. *Claim Interpretation in General*

To determine the meaning of claims, we must examine the patent specification, other claims, and the prosecution history. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979, 34 USPQ2d 1321, 1329 (Fed. Cir. 1995) (*in banc*). Resort to testimony of those knowledgeable in the art might also be helpful to the court inasmuch as claims are interpreted from the perspective of one of ordinary skill in the art. *SmithKline Diagnostics, Inc. v. Helena Lab. Corp.*, 859 F.2d 878, 882, 8 USPQ2d 1468, 1471 (Fed. Cir. 1988).

B. *The Specification and Claim*

The patent specification discusses the invention in terms of an additive for motor oil which does not interfere with the function of other additives. The particular focus is on addition of the copper compound as an antioxidant and the amount of it that is employed. Moreover, the amounts specified in the working examples and other parts of the specification are identified as the amount of the additives, not the amounts in the final product after mixing. There is no analysis anywhere in the specification of the identity of intermediate or final "complexation" products produced by combining the ingredients specified in the claims, or of their amounts. In light of those omissions, to say that one of ordinary skill in the art would nevertheless conclude that the proportions must be measured in the pot is divorced from reality.

The interpretation that the claims list starting ingredients is bolstered by comparing the many nonborated, ashless dispersants disclosed at columns 6-8 of the patent, and expressly included in the claims, with the one type of dispersant—the borated version of certain ashless dispersants—that the parties agree does not complex with the metal moieties from the other ingredients specified in the claims. Because the nonborated, ashless dispersants do not remain completely ashless when mixed with the other ingredients specified in the claims, under the majority's interpretation the claims would not cover use of such dispersants if a sufficient amount thereof complexed with metal to form nonashless dispersants. Yet, it is those nonborated dispersants to which the specification and claims are primarily directed.[5] Consequently, the majority interpretation limits coverage to far fewer dispersants than indicated by the specification and claims.

Moreover, the '890 specification does not describe nor teach the invention contemplated by the majority's claim interpretation, *i.e.*, it does not teach the types of dispersant, the amounts thereof, or the conditions needed to attain a composition containing—after complexation—the amounts of ingredients specified in the claims. Although, under the majority's interpretation, the specification would be enabling for the claimed borated dispersants (because they do not complex), those dispersants constitute only a small portion of the disclosed and claimed dispersants. Hence, formulating the composition as interpreted by the majority, even if within ordinary skill in the art, would require extensive

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[5] Borated ashless dispersants are discussed at column 8, lines 43-50 of the '890 specification and are used in the four working examples. Of the 83 claims in '890, claims 7, 14-24, 30, 37-60, 65, and 72-82 specifically mention the borated, as well as other, dispersants.

experimentation not even suggested in the patent, thereby rendering the claims invalid.[6]

C. *Prosecution History*

As does the specification, the prosecution history focuses on the additives as starting ingredients, not on any reaction products (and the amounts in a final or intermediate product). As an example, the Examiner's Answer prepared with respect to appeal of the examiner's rejection of the claims in Application Ser. No. 362.114 (which was the grandparent of Application Ser. No. 49,712, the application resulting in the '890 patent), states

> The claims are believed to be directed to the composition comprising known additives, combined at conventional levels of additions for their combined attendant functions.

And in the Reply Brief to that Examiner's Answer, the applicants state:

> The question should be whether the specific combination of additives claimed by Appellants is novel, and gives it unobvious results. The answer is the combination is novel and the combination does give unexpected results.

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[6] *See generally Genetech, Inc. v. The Wellcome Foundation Ltd.*, 29 F.3d 1555, 1564-65, 31 USPQ2d 1161, 1168 (Fed. Cir. 1994) (rejecting a claim interpretation that covers many inoperative permutations); *Atlas Powder Co. v. E.I. duPont De Nemours & Co.*, 750 F.2d 1569, 1576-77, 224 USPQ 409, 414 (Fed. Cir. 1984) ("if the number of inoperative combinations becomes significant, and in effect, forces one of ordinary skill in the art to experiment unduly in order to practice the claimed invention, the claims might indeed be invalid"); *Raytheon Co. v. Roper Corp.*, 724 F.2d 951, 956, 220 USPQ 592, 596 (Fed. Cir. 1983) ("Because it is for the invention as claimed that enablement must exist, and because the impossible cannot be enabled, a claim containing a limitation impossible to meet may be held invalid under § 112."), *cert. denied*, 469 U.S. 835 (1984).

And elsewhere during prosecution of that application, and of SN 049,712, the examiner refers to "the various additives of the claims (dispersants ... dithiophosphates ...)."

Exxon's interpretation is also supported by the following episode. SN 362.114 included both claim 37, which referred to a "copper compound," and claim 38, which was to a "composition according to claim 37, said copper compound being oil soluble." Claim 38 was rejected because it duplicated claim 37.[7] The examiner took the position that the copper compound *must* be oil soluble—hence, "copper compound" and "oil soluble copper compound" are the same. The applicants, however, argued that "[o]ne can have a solution of a *dispersant complexed* with an oil insoluble copper compound, or can have an oil soluble [copper] compound" (emphasis added). Similar debate transpired during prosecution of Application SN 177, 367, the parent of SN 362,114. The Board agreed with applicants.[8]

The argument made during prosecution that some of the claims read on embodiments wherein the copper complexes with the ashless dispersant is probative of Exxon's claim interpretation as well as that of the examiner. Specifically, it shows the claim is directed to a product with "ashless" dispersant as a starting ingredient, inasmuch as some of the claims covered formation of a complex between that dispersant

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[7] Paragraph 2 of 35 U.S.C. § 112 (1988), states: "The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention."

[8] The Board noted that the examiner had not yet raised an "insufficient disclosure" rejection (under 35 U.S.C. § 112, ¶ 1). That rejection was subsequently raised, in the context of rejecting claims 15-17 of SN 049,712 on the specific ground of insufficient support in the specification for an oil insoluble copper compound. Those claims were eventually dropped by applicants.

and the metal, a formation that would render the dispersant "non-ashless". Significantly, the examiner found no flaw in claiming a motor oil product with additives as set out in Exxon's claim here (and I note in its foreign applications as well).

D. *Other Considerations*

The record includes testimony by Exxon witnesses that it is not known how copper serves as an antioxidant in the environment of the claimed composition, that certain reactions are not predictable in that environment, even though they might be predictable in a model, that it is uncertain whether zinc or phosphorus of ZDDP undergoes interaction, and in general, that no one was certain of the exact identity of the final composition or what was happening in the pot. Despite that, the majority holds applicants responsible for knowing about the formation of a complex between the five ingredients required by the claims. In effect, therefore, the majority opinion penalizes applicants for not knowing or caring about exactly how their invention works.

But, "it is axiomatic that an inventor need not comprehend the scientific principles on which the practical effectiveness of his invention rests." *Fromson v. Advance Offset Plate, Inc.*, 720 F.2d 1565, 1570, 219 USPQ 1137, 1140 (Fed. Cir. 1983); *accord In re Isaacs*, 347 F.2d 887, 892, 146 USPQ 193, 197 (CCPA 1965). As stated in *Diamond Rubber Co. v. Consolidated Rubber Tire Co.*, 220 U.S. 428, 435-36 (1911):

> And how can it take from his merit that he may not know all of the forces which he has brought into operation? It is certainly not necessary that he understand or be able to state the scientific principles underlying his invention, and it is immaterial whether he can stand a successful examination as to the speculative items involved. [Citations omitted.]

In that respect, Frank Johmann, who helped prosecute the relevant applications for Exxon, stated:

> [When looking at an invention like this with a number of components, to determine infringement] ... you look at what is combined to make the product. The reason for that is that the patent law doesn't require that you understand what happens to that final product. All that is necessary is how you obtain the result. And it is sort of like baking a cake. You mix them together. And what happens chemically in the oven, you are not concerned with. With these compositions, what happens in the engine no one really knows and it is not a consideration.

Mr. Johmann stated that he has "seen probably literally thousands of lubricant patents over the years, and this is like a standard format for a composition." *Id.* Thus, claiming the composition in terms of amounts of additives is "a typical way it is done in connection with motor oil additives." *Id.* Though Mr. Johmann was a patent practitioner, as opposed to a scientist skilled in the art, he adds to the record the perspective of one who has seen many patents in this field, and by shedding some light on how claims have been written in the field, he helps illuminate how one skilled in the art would read the '890 claims.

Furthermore, when Lubrizol asked its own employee, Mr. Pindar, in 1988 to determine whether certain of its products infringed the European counterpart of '890, he performed the analysis by comparing the starting ingredients, not the final or intermediate products. Mr. Pindar, who was a scientific advisor to Lubrizol, read the claims as a person of skill in the art would read the claims. Moreover, Dr. Salomon, a lubricant formulator working for Lubrizol, testified (although not in the specific context of interpreting claim language) that her concern as a formulator is "what goes in the pot."

Lubrizol argues that Exxon's omission of the word "mixture" from the '890 claims precludes interpretation of the claims as a list of starting ingredients. This is indeed a slender reed on which to lean. "Mixture" is implied in the composition claims at issue, because by listing five "additives," the claim implies that coverage is for a mixture of those. Thus, Exxon is claiming a "composition of matter," which:

> "... is an instrument formed by the intermixture of two or more ingredients, and possessing properties which belong to none of these ingredients in their separate state.... The intermixture of ingredients in a composition of matter may be produced by mechanical or chemical operations, and its result may be a compound substance resolvable into its constituent elements by mechanical processes, or a new substance which can be destroyed only by chemical analysis." [Footnote omitted.]
>
> Walker notes that "this class is a very broad one and embraces chemical compounds, mechanical or physical mixtures, alloys and a great variety of things." [Footnote omitted.]

1 Chisum, PATENTS, § 1.02[2] at 1-10 (1995) (quoting from W. Robinson, The Law of Patents for Useful Inventions 278-79 (1890)).

E. *Conclusion*

Lubrizol added to its motor oil the ingredients taught by the specification, and articulated in the claims, of Exxon's '890 patent. Lubrizol then sought to avoid infringement by arguing at trial that the claims are not literally infringed because metal ions from some of the ingredients complex with the ashless dispersant specified in the claims, converting "ashless dispersant" to nonashless dispersant. That argument was unsuccessful under the district court's claim

interpretation, but it has succeeded on appeal under the majority's claim interpretation.

The majority and concurring opinions seem to be of the view that, if Exxon wanted to claim a lubricating oil composition formed by combining the five ingredients specified in the claims, it made a technical error in writing the claims. The majority would require a product by process claim to cover a product comprising a formula of starting ingredients even though the claim requires no particular method of mixing or particular process steps. It is not a "recipe" with specific directions for making the product. Certainly the examiner found nothing technically wrong with the claim as a list of additives for motor oil. In the view of an experienced claim drafter, Mr. Johmann, this is a standard form for such a product. I am of the view that, to one of ordinary skill in the art, the claims as written cover a product, not a method.[9] Consequently, I disagree with the majority and would affirm the district court's judgment of liability.

II.

I would add that the majority's reversal is an extraordinary disposition assuming its interpretation were correct. This appeal challenges the district court's ruling on Lubrizol's renewed motion for JMOL under Fed. R. Civ. P. 50. The majority holds that the district court's ruling on the merits of Lubrizol's motion was correct. Lubrizol's argument for JMOL—that the claims define the final product—is rejected. If Lubrizol had attempted to advance the position of the majority in this appeal, we would have rejected the

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[9] The majority, in its footnote 3, questions whether the claims as so interpreted would be literally infringed if one of the "starting ingredients" is made in situ. That issue is not before us, but it appears to me that there would be literal infringement in such a circumstance because the product formed "in situ" itself can be considered a "starting ingredient".

argument is outside the grounds asserted in the JMOL motions, before submission to the jury, as well as after the verdict was returned. *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1579, 1 USPQ 1081, 1091 (Fed. Cir. 1986) ("A specific reference to an issue in a motion for JNOV cannot preserve that issue for appeal where that issue was not specifically included in a motion for directed verdict made before the jury retired to consider its verdict."); *Malta v. Schulmerich Carillons, Inc.*, 952 F.2d 1320, 1324, 21 USPQ 1161, 1164 (Fed. Cir. 1991) ("'Fed.R.Civ.P. 50(b) allows for entry of JNOV 'only in accordance with the party's motion for a directed verdict.'"), *cert. denied*, 504 U.S. 974 (1992).[10] The issue on appeal is not the global question "What do Exxon's claims mean?" but rather "Did the district court err in denying Lubrizol's JMOL?" It is not unusual to see a case where a party failed to raise a defense on which it might have prevailed. However, our review of a trial court's ruling on a motion for JMOL is limited to the grounds

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[10] The majority does not dispute the proposition of law quoted from *Orthokinetics* but relies on an alternative ground of decision that no objection was made to the grounds stated in the post-verdict motion. In *Malta*, this court held that a general post-trial JMOL motion incorporated the specifics of the earlier JMOL motion. The majority finds support in *Malta* because the broader meaning it gives the claim than that advanced by Lubrizol is smaller than the spread between the general and specific motions in *Malta*. I read *Malta* to say that the general and specific motion in that case were the same. In any event, the majority's premise that Exxon is not prejudiced by denial of a new trial is flawed because the majority advanced a broader claim interpretation than that advanced by Lubrizol. Infringement of a narrower claim would establish infringement of a broader claim to the same invention, but the converse is not true. Failure to prove infringement of the narrower claim does not establish non-infringement of the broader claim.

asserted." The authority of an appellate court to enter a judgment rather than remand is severely circumscribed. If no motion for JMOL on the issue is made an "appellate court [is] without power to direct the District Court to enter judgment contrary to the one it had permitted to stand." *Cone v. West Virginia Pulp & Paper Co.*, 330 U.S. 212, 218 (1947); *see also Biodex Corp. v. Loredan Biomedical, Inc.*, 946 F.2d 850, 854, 20 USPQ2d 1252, 1255 (Fed. Cir. 1991) ("Quite clearly, the only available remedy upon finding error in a judgment entered on a jury verdict where [issue not preserved by proper JMOL] is limited to a remand for a new trial."), *cert. denied*, 504 U.S. 980 (1992).

The precedent cited by the majority for reversal is inapt. In *Laitram Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 19 USPQ2d 1367 (Fed. Cir. 1991), this court agreed with the appellant's position raised below by JMOL and on appeal. No material issue of fact prevented entry of judgment on appeal. In *Jamesbury Corp. v. Litton Indus. Prods.*, 756 F.2d 1556, 225 USPQ 253 (Fed. Cir. 1985), the JMOL was reversed on the argued grounds and the case was remanded for trial of other issues. *Dana Corp. v. IPC Ltd. Partnership*, 860 F.2d 415, 8 USPQ2d (Fed. Cir. 1988), *cert. denied*, 490 U.S. 1067 (1989), reversed a JMOL on the ground argued below and on appeal.

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[1] Fed. R. Civ. P. 50: Notes of Advisory Committee on Rules (1991 Amendment) state:

> The second sentence of paragraph (a)(2) does impose a requirement that the moving party articulate the basis on which a judgment as a matter of law might be rendered. The articulation is necessary to achieve the purpose of the requirement that the motion be made before the case is submitted to the jury, so that the responding party may seek to correct any overlooked deficiencies in the proof.

The wisdom of Rule 50 cannot be gainsaid. By advocating a different interpretation of the claim *sua sponte*, the majority required Exxon to litigate during trial not only its opponent's position but also the unknowable position of the appellate court. Exxon has been deprived of a jury trial on an unasserted and *untried* theory. The majority decision comes out of the blue. The majority opines that the requirement that Exxon prove infringement of a *product* claim does not come out of the blue, and that Exxon, therefore, is not entitled to escape the flaw of its claim drafting by a second trial. This reflects the majority's view, not Exxon's, that a list of additives for motor oil is an invention for a process or for a product made by a process. Exxon never asserted that its claim was for anything for a product. Without pointing to any rule set by the statute or a regulation or by the MANUAL OF PATENT EXAMINING PROCEDURE, the majority decides that Exxon's standard type of claim is poorly drafted.

The majority then states that Exxon attempted to prove infringement under the majority's claim interpretation by evidence of what happened chemically in the pot in pre-final states. This evidence "is credited" in determining the post-trial motion. The record discloses that Lubrizol attempted to prove that its *final* product did not contain ashless dispersant because of what happened in the pot. Lubrizol's theory was that its dispersant, although ashless to begin with, complexed with metal so as to become non-ashless in the *final* product. Exxon countered with evidence that such complexation was transient. To rule for Lubrizol, the majority must assume that the absence of proof by Exxon, for example, that for a few moments after mixing no complexation occurred—which would satisfy the majority's claim interpretation—means that that fact could not be proved. Whether or not Exxon was precluded from such proof is debatable. That issue was not part of Exxon's or Lubrizol's theory of the case. But

precluded or not, there was no reason for Exxon to evaluate any intermediate product.

The majority notes its claim interpretation is broader than that of Lubrizol and, therefore, it is easier to prove infringement, but Exxon is denied that opportunity. In my view this is untenable. I read nothing in *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 34 USPQ2d 1321 (Fed. Cir. 1995) which sanctions this procedure. *Markman* upheld a ruling on a JMOL motion. Exxon cannot conceivably have waived the issue of infringement under the majority's broader claim construction, as the majority rules. Exxon proposed deletion of an instruction on infringement by equivalents in the final version of the instructions, but this revision occurred only after the district court adopted Exxon's claim interpretation in its instructions. Exxon did not waive this issue in connection with Lubrizol's or the majority's different interpretation of the claim. The most the majority could say, as a matter of law, is that there is no possibility of proof of literal infringement. However, the question of infringement under the doctrine of equivalents is a jury question under the recent decision of this court in banc. *Hilton Davis Chem. Co. v. Warner-Jenkinson Co.*, No. 93-1088, 1995 U.S. App. Lexis 21069, at *24 (*per curiam*) (Fed. Cir. Aug. 8, 1995). The majority simply cuts Exxon off from its right to have the issue of infringement under the majority's claim interpretation tried to a jury.

For the foregoing reasons, I dissent to the merits and to the procedure adopted by the majority.

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

EXXON CHEMICAL PATENTS, INC., EXXON CORPORATION, and EXXON RESEARCH AND ENGINEERING COMPANY,	§	
Plaintiffs and Counter-Defendants	§	
VS.	§	CIVIL ACTION
	§	NO. H-89-3203
THE LUBRIZOL CORPORATION,	§	
Defendant and Counter-Plaintiff.	§	

PERMANENT INJUNCTION

On December 23, 1992 after a multi-week trial, the jury returned a verdict finding (a) that Exxon's U.S. Letters Patent 4,867,890 is valid and enforceable, (b) that Lubrizol has directly infringed Claim 61 of the patent, and has contributorily infringed and induced the infringement of Claim 1 of the patent, (c) that such infringement was willful and (d) that Lubrizol has acted in bad faith. On the basis of the full record at trial, the jury verdict, and the applicable law, this Court finds and holds that the patent is valid, willfully infringed and enforceable, and that Lubrizol has acted in bad faith. The Court also finds and holds that the provisions of this Permanent Injunction are appropriate and necessary to protect Plaintiffs' rights under this patent. Accordingly, the Court grants Exxon's application for an Order of Permanent Injunction.

IT IS ORDERED:

1. The Lubrizol Corporation, its subsidiaries, divisions and affiliates, and their directors, officers, agents, servants, representatives, employees, successors and assigns, and all persons in active concert or participation with any of them who receive notice of this injunction, are enjoined:

a. from making, using or selling the following products in the United States:

3577X	7888	8855	8870
6529	7888N	8855C	8870A
6589U	8385A	8855D	8875D
7574H	8385F	8855E	8887
7574L	8805	8855F	8887A
7574X	8805F	8855G	8889
7608P	8818	8855K	8908
7808C	8821	8855W	8909
7882	8850A	8865	8910
7884	8852	8866	8912

or any other products no more than colorably different from one or more of the products listed above;

b. from making, using or selling any lubricating oil concentrate composition that infringes Claim 61 of U.S. Letters Patent No. 4,867,890;

c. from inducing infringement or contributorily infringing Claim 1 of U.S. Letters Patent No. 4,867,890, by manufacture, use or sale of lubricating oil concentrate compositions; and

d. from otherwise directly infringing, contributorily infringing, or inducing infringement of the claims of U.S. Letters Patent No. 4,867,890.

2. Within twenty-four hours from the signing of this Permanent Injunction, Lubrizol shall contact all customers

who have purchased from Lubrizol any infringing product within the last sixty days and advise those customers of the terms of this permanent injunction order.

3. Within fourteen days of the signing of this Permanent Injunction, Lubrizol shall file with the Court and provide to Exxon an accounting of all infringing products shipped or sold since December 23, 1992 to any United States customer or sold or shipped by Lubrizol from anywhere in the United States to any customer, regardless of where the customer is located.

4. During the terms of U.S. Letters Patent No. 4,867,890, prior to selling in the United States any copper-containing lubricating oil composition suitable as a crankcase lubricant in internal combustion engines, or any copper containing component intended therefor, or any copper-containing lubricating oil concentrate composition suitable for use in preparing a crankcase lubricant in internal combustion engines, or any copper containing component intended therefor, Lubrizol shall submit to Exxon or its designee specification sheets, formula cards, blend cards, recommended treat rates and any other information necessary for Exxon to determine whether such composition would infringe the claims of the patent. Such information shall be subject to an appropriate Protective Order to be entered.

5. This Permanent Injunction includes without limitation the prohibitions set out in 35 U.S.C. § 271(f)(1) and (2).

6. This Court retains jurisdiction to interpret and enforce the provisions of this Permanent Injunction, including any future question of its violation or of infringement by Lubrizol of U.S. Letters Patent No. 4,867,890.

Signed at 2:00 p.m. this 7th day of January, 1993 at Houston, Texas.

s/ Norman Black
NORMAN W. BLACK
CHIEF JUDGE

ENTERED FEB. 5 1993

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

EXXON CHEMICAL PATENTS, INC., EXXON CORPORATION, and EXXON RESEARCH AND ENGINEERING COMPANY,	§	
Plaintiffs and Counter-Defendants,	§	
v.	§	CIVIL ACTION
	§	NO. H-89-3203
THE LUBRIZOL CORPORATION,	§	
Defendant and Counter-Plaintiff.	§	

FINAL JUDGMENT ON LIABILITY

On December 23, 1992, the Jury returned its verdict on the Court's written questions. On the basis of the Jury's findings, the evidence at trial, the findings of this Court and the applicable law

It is ORDERED, ADJUDGED AND DECREED as follows:

1. This Court has jurisdiction over the subject matter of this action and of the parties. Venue is proper. Each plaintiff has standing.

2. U.S. Patent No. 4,867,890 issued September 19, 1989.

3. Lubrizol has not carried its burden of overcoming the presumption of validity of U.S. Patent No. 4,867,890. It is not invalid under 35 U.S.C. § 102(a), (b), (e), (f) or (g), nor would it have been obvious under 35 U.S.C. § 103.

4. U.S. Patent No. 4,867,890 is enforceable and Exxon did not commit inequitable conduct in obtaining that patent.

5. Lubrizol has directly infringed claims 61, 62, 63 and 72 of U.S. Patent No. 4,867,890 by the manufacture, use and sale of its product 8855G and the products identified on Appendix A (except 8385A and 8385F).

6. Lubrizol has induced infringement of claims 1, 25, 27 and 37 of U.S. Patent No. 4,867,890 by the manufacture, use and sale of its product 8855G and its products identified on Appendix A by inducing its customers to directly infringe these claims.

7. Lubrizol has contributorily infringed claims 1, 25, 27 and 37 of U.S. Patent No. 4,867,890 by the manufacture, use and sale of its product 8855G and the products identified on Appendix A to its customers who directly infringed these claims.

8. Lubrizol's infringement of U.S. Patent No. 4,867,890 was willful.

9. Lubrizol has acted in bad faith throughout this entire litigation.

10. Lubrizol is permanently enjoined from infringing U.S. Patent No. 4,867,890 as set out in the Permanent Injunction, signed January 7, 1993, and shall obey all terms of that Injunction.

11. Lubrizol's First and Third Counterclaims of Its Amended Answer and Counterclaim, seeking certain declaratory relief and asserting antitrust allegations, are dismissed with prejudice.

Plaintiff's motion for attorneys' fees and sanctions (entry 481) is taken under advisement.

IT IS SO ORDERED.

Signed this 5th day of February, 1993 at Houston, Texas.

s/ Norman Black
NORMAN W. BLACK
CHIEF JUDGE

Appendix A

LUBRIZOL PRODUCTS

3577X	7888	8855	8870A
6529	7888N	8855C	8875D
6589U	8385A	8855D	8887
7574H	8385F	8855E	8887A
7574L	8805	8855F	8889
7574X	8805F	8855K	8908
7608P	8818	8855W	8909
7808C	8821	8865	8910
7882	8850A	8866	8912
7884	8852	8870	

ENTERED FEB. 16 1993

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

EXXON CHEMICAL PATENTS, INC., et al.,	§	
	§	
Plaintiffs	§	
	§	
v.	§	CIVIL ACTION
	§	NO. H-89-3203
THE LUBRIZOL CORPORATION,	§	
	§	
Defendant.	§	

ORDER

Pending before the Court are several motions in the above matter. Responses and reply briefs have been filed. A trial on liability was held in December 1992 and after hearing all the evidence a jury found for Plaintiff. Defendant, The Lubrizol Corporation ("Lubrizol") has moved for judgment in its favor, amended findings and judgment or, alternatively, a new trial. Defendant contends the evidence presented at trial establishes that the verdict was inconsistent with the law governing the case and believes all claims against it should be dismissed, the permanent injunction vacated and that the Court's findings and judgment on the issue of the '890 Patent should be amended. In the alternative, Defendant asserts the rulings and charges by the Court were contrary to both the law and the weight of the evidence resulting in an unfair trial.

The Court has again reviewed Lubrizol's argument that it did not infringe the '890 Patent or that the '890 Patent is

invalid. There was extensive testimony at trial regarding LeSuer '493 Patent and its possible relationship to the '890 Patent. The jury heard Defendant's expert witnesses testify and had an opportunity to assess their credibility and determine what weight to give their testimony. Their rejection of Lubrizol's position can easily be supported by the evidence.

Lubrizol continues to assert that Exxon Corporation is not a proper party. This issue was resolved early in this litigation and the Court found The Exxon Corporation is the sole legal entity with the right to license the patent and bring suit against infringers. Defendant also asserts a new trial is warranted based on claims construction. This argument lacks merit as well.

In addition, Lubrizol contends there was an erroneous jury instruction on the issue concerning inequitable conduct. The Court meticulously reviewed the jury instructions before they were given. After reevaluating Issue No. 8 the Court finds it clearly set forth the burden of proof and the jury was thoroughly instructed on inequitable conduct. Furthermore, Lubrizol failed to properly object or preserve error on this point. Lubrizol also complains that it was prejudiced because of additional errors in the jury instructions. Once again, the Court finds these arguments are meritless.

Finally, Lubrizol contends the Court erred by unduly limiting trial time and the number of expert witnesses. Lubrizol had a full and fair trial and was not deprived of due process. The Court has broad discretion in determining how a trial shall proceed. This claim is frivolous. Based on the above, it is

ORDERED that Defendant Lubrizol's motion for judgment in its favor, amended findings and judgment or, alternatively, a new trial (entry 491) is DENIED. It is further

ORDERED that Defendant Lubrizol's motion for judgment as a matter of law at the close of all the evidence (entry 464) is MOOT as this motion was denied on the record during trial. It is further

ORDERED that Defendant Lubrizol's motion *in limine* to exclude Magistrate-Judge Botley's January 30, 1991 Memorandum and Order (entry 406) is MOOT. It is further

ORDERED that Defendant Lubrizol's motion to protect the parties' confidential information during and after trial (entry 427) is MOOT. It is further

ORDERED that Plaintiff's motions concerning attorneys' fees, costs and sanctions (entries 422 and 481) are under advisement.

IT IS SO ORDERED.

Signed this 12th day of February, 1993 at Houston, Texas.

s/ Norman Black
NORMAN W. BLACK
CHIEF JUDGE

FILED FEB. 17 1993

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

EXXON CHEMICAL PATENTS, INC., EXXON CORPORATION, and EXXON RESEARCH AND ENGINEERING CO.,	§	
Plaintiffs	§	
v.	§	CIVIL ACTION
	§	NO. H-89-3203
THE LUBRIZOL CORPORATION,	§	
Defendant.	§	

ORDER

This case was filed on September 19, 1989 as part of the continuing saga of the two leading oil additive manufacturers' use of the judicial process to try to obtain market advantage over each other. Plaintiffs ("Exxon") and Defendant ("Lubrizol") have attacked each other in the courts of Canada and the United States over a number of issues and over a long period of time.

When this Judge became aware fairly early in this case that there was a very high likelihood that the fact finder would conclude that the patent had been infringed and that settlement was in the best interests of the shareholders of the parties, every effort was made to encourage resolution of the issues short of a jury trial. The Judge held frequent conferences with counsel and resolved as many of the complex disputes as time permitted. When the discovery disputes began to drive

the case, Magistrate Judge Calvin Botley provided excellent service to the parties in helping to resolve those disputes. It soon became evident that Lubrizol was not at all interested in settlement, but preferred a war of attrition by resisting reasonable discovery and by continuously injecting into the case extraneous and inflammatory issues calculated solely to embarrass Exxon and cause as much expense and delay as its counsel could invent. The Magistrate Judge soon lost patience with Lubrizol, and the Judge began to assume as much control over the case as possible.

After becoming convinced that the best interests of both parties was in settlement, the Judge assigned the case for mediation to Alan F. Levin, Esquire, who possessed every qualification for mediating this dispute including a degree in psychology. Unfortunately, Mr. Levin did not major in abnormal psychology, and the mediation ultimately failed.

When counsel presented the Judge for *in camera* inspection thousands of pages of complex documents containing reference to this particular chemical patent and other chemistry-related matters, the Mediator was named Special Master to attempt to resolve the confidentiality questions. Mr. Levin worked literally night and day for an extended period of time and resolved those disputes to the Court's satisfaction.

During and after Mr. Levin's work, the Judge held a number of face-to-face meetings with the attorneys and the highest officials of both Exxon Chemicals and Lubrizol to explore the issues and to lend his services to bring the case to a conclusion fair to both sides. These settlement efforts are mentioned only to help explain why this case began to take on a life of its own, and *neither party is being penalized in any way for refusing to settle*.

After concluding that the case had reached the point where it had to be tried, the Court (with the agreement of

counsel) bifurcated the trial, and the issue of liability only was submitted to a jury. On the tenth day of trial, December 23, the Jury found for Exxon on all issues including a finding of "willful infringement." The Order denying Lubrizol's motion for entry of judgment in its favor was docket entry number 505.

Pending before the Court are Exxon's motions for the recovery of attorneys' fees and related costs, for sanctions and for enhancement of damages. Plaintiffs have briefed four provisions of law to sustain their claim for attorneys' fees and costs: 1) 35 U.S.C. § 285, 2) 28 U.S.C. § 1927, 3) Rule 11, Fed. R. Civ. P. and 4) the Court's inherent power. Responses have been filed as well as reply briefs. In addition, Plaintiffs have submitted voluminous billing records in support of their request. After consideration of the jury verdict, the briefs, and the detailed and voluminous billing records of Exxon's counsel, the Court finds that an award of attorneys' fees and costs is appropriate in this case. The Court has also considered Lubrizol's submission of its attorneys' fees and costs.

To award attorneys' fees under § 285 and § 1927 the Court must ascertain whether this is an exceptional case. Factors to consider are willful infringement, bad faith, vexatious litigation and/or litigation misconduct. *See, e.g., Alyeska Pipeline Co. v. Wilderness Society*, 421 U.S. 240, 257-59 (1975); *Bott v. Four Star Corp.*, 807 F.2d 1567, 1574 (Fed. Cir. 1986). This is a factual finding. *See Reactive Metals Alloys Corp. v. E.S.M., Inc.*, 769 F.2d 1578 (Fed. Cir. 1985).

In this case, the jury determined that the infringement was willful and it is the duty of this Court to verify that this factual determination is supported by substantial evidence. "[W]hen a trial court denies attorney fees in spite of a finding of willful infringement, the court must explain why the case

is *not*, "exceptional" within the meaning of the statute." *Modine Manufacturing Company v. Allen Group, Inc.*, 917 F.2d 538, 543 (Fed. Cir. 1990), *cert. denied*, 111 S.Ct. 2017 (1991) *citing S.C. Johnson & Son, Inc. v. Carter-Wallace, Inc.*, 781 F.2d 198, 201 (Fed. Cir. 1986). "The trial judge is in the best position to weigh considerations such as the closeness of the case, the tactics of counsel, the conduct of the parties, and any other factors that may contribute to a fair allocation of the burdens of litigation as between winner and loser. . . ." *Id.* at 201.

Defendant's primary defense to willfulness is that it could not willfully infringe because it was sued on the day the '890 patent issued. It is possible to have willful infringement before a patent issues. *See Milgo Electric Corp. v. United Business Communications, Inc.*, 623 F.2d 645, 665 (10th Cir.), *cert. denied*, 449 U.S. 1066 (1980). The evidence shows that Defendant was not an innocent manufacturer unaware of Exxon's forthcoming patent rights and the jury properly found willful infringement. The patent at issue was in the Patent Office for some nine years before it was granted, and Exxon had previously obtained a very similar patent in the European Patent Office.

It is impossible for the Court to list all the incidents of willfulness, vexatious litigation, and bad faith that has occurred to date, but a few illustrations will be given. Immediately following the filing of this lawsuit, Defendant filed a declaratory judgment action in Ohio and failed to inform that Court of the pending Texas litigation. This Court was forced to confer with the Judge handling that case and both judges decided that justice demanded that the litigation remain in Texas.

Every issue raised was disputed and thoroughly overbriefed. There were motions, responses, replies, responses to the replies, and exhibits flowed like oil. Lubrizol

filed many unnecessary motions. For example, a motion to reconsider was filed after essentially every ruling. Defendant's filing of its second counterclaim asserting the alleged infringement of the LeSuer '493 patent, which had expired more than six years before, was time-barred and clearly frivolous at the time it was filed. Defendant also went through a period of time where it filed all its pleadings under seal claiming privilege where there was no legitimate argument for such claim. While a few of these documents should remain confidential, Lubrizol abused this process far more than Exxon did.

The discovery disputes in this case were beyond compare and to document them would require a law review article to supplement this memorandum. The record is replete with warnings by the Court and the Magistrate Judge followed by broken promises by Defendant to discontinue such conduct.

The only part of this litigation that withstands scrutiny for violation of the canons of ethics and the Federal Rules of Civil Procedure is the conduct of William C. Slusser and Lee Kaplan for Exxon and Carol Vance for Lubrizol. They did their best to control the cost and delay of this litigation and performed according to the highest standards of their profession. Unfortunately for Lubrizol, it was evident early in this case that Mr. Vance was not being permitted to control Lubrizol. The Lubrizol pre-trial and trial strategy was under the control of its other counsel.

The court has reviewed Plaintiffs' request for attorneys' fees and costs in light of the factors set forth in *Johnson v. Georgia Highway Express, Inc.*, 488 F.2d 714, 720 (5th Cir. 1974) and makes the following findings:

1. The time and labor required. This suit was filed in September 1989 in the Southern District of Texas. Defendants immediately filed a declaratory judgment action in Ohio then moved to dismiss the Texas case. Defendant concurrently

claimed this Court lacked jurisdiction alleging the patent had not issued. That issue was taken to the United States Court of Appeals for the Federal Circuit. This was only the beginning. Every point became a hotly contested issue, and the discovery became so unmanageable that even the Special Master had to suspend his busy law practice to review the large number of documents submitted for *in camera* review. Numerous hearings were held on various topics.

Plaintiffs retained the services of the law firms of Baker & Botts and Fitzpatrick, Cella, Harper & Scinto to assist them in this litigation. Exxon is not seeking recovery of the fees it paid to the Cleveland law firm for defending the duplicative Ohio suit or for fees for in-house counsel which may be recoverable where the work performed would otherwise be done by outside counsel.

After careful review the Court accepts as reasonable the documentation of Exxon's counsel as to time required by the attorneys involved and finds no reason to adjust these amounts up or down.

2. The novelty and difficulty of the questions. This case involved many complicated issues and unique problems. The analytical effort involved, especially during discovery, made this case exceptional and difficult. The introductory part of this memorandum spells out these matters in detail.

3. The skill requisite to perform the legal service properly. This is a complex patent infringement case. Plaintiffs' counsel capably presented and pursued their case. The Court found all issues ably briefed by Exxon's counsel and finds that their excesses were mandated by the action of Lubrizol's counsel.

4. The preclusion of other employment by the attorney due to acceptance of the case. Plaintiffs' counsel did not mention whether work on this case precluded other

employment, but the Court knows that both Mr. Slusser and Mr. Kaplan had to have devoted 100% of their time to this case over a substantial period of time.

5. The customary fee. Exxon counsel have submitted to the Court *in camera* several bound volumes concerning the fees it charged its clients in this litigation. The Court finds these rates to be within the expected range for attorneys of these experience levels in the Houston legal community and, in absence of any contrary evidence, concludes that they are reasonable.

6. Whether the fee is fixed or contingent. The fee here was apparently fixed. The Court finds no basis in this factor to adjust the award upward or downward.

7. Time limitations imposed by the client or the circumstances. Counsel did not spell out any particular problems, but it is obvious that this case monopolized a substantial portion of their time.

8. The amount involved and the results obtained. The amount of fees and costs involved in this case by both sides are, to use a word that barely suffices, astronomical. Although the damages portion of the trial has not yet taken place, it is obvious from the amount of money spent by both sides on the issue of liability that the product covered by the '890 patent is extremely profitable.

9. The experience, reputation, and ability of the attorneys. All of the law firms involved in this case are sizable and well respected. The Court is personally familiar with the excellent reputation of many of the individual attorneys. For the purposes of this analysis, the Court finds that all of the attorneys for Exxon were highly experienced, possessed excellent reputations and showed great ability.

10. The "undesirability" of the case. Counsel did not claim any element of undesirability attached to this case, but

the Court finds that the only "desirable" factor was that both clients had deep pockets and understanding general counsel.

11. The nature and length of the professional relationship with the client. Plaintiff has retained the services of Baker & Botts for several decades and that firm often retains additional counsel when necessary. This factor does not suggest adjustment of the fee upward or downward.

12. Awards in similar cases. Neither party has presented evidence of other awards in analogous cases, and the Court seriously doubts that there is a "similar" case. The Court's experience and research indicate that the amount claimed by Exxon's counsel is at least proportionate to that awarded in large, complex cases.

Although Plaintiffs' fees and costs are far and away more than they should have been, they were necessarily incurred because of Lubrizol's conduct. Defendants, though vigorously opposed to Plaintiffs' request for attorneys' fees and costs, have failed to challenge the reasonableness of the time spent or fees charged. It is interesting that Lubrizol's attorneys' fees and costs closely approximate Exxon's. The thrust of their opposition is that Plaintiff's application for attorneys' fees lacks sufficient specificity to allow this Court to make a fair award. While the summary sent to Defendant may not contain the detail desired, the Court has been given four bound volumes *in camera* of supporting material and billing records.

Plaintiff requests prejudgment interest at the rate of 8.5%, compounded daily, on any award of attorneys' fees. Under § 285 the Court is authorized to make such an award if it finds "bad faith or other exceptional circumstances. . . ." *Matis v. Spears*, 857 F.2d 749, 761 (Fed. Cir. 1988). The Court does not choose to award prejudgment interest.

Plaintiffs also seek a finding that they will be entitled to enhanced damages pursuant to 35 U.S.C. § 284 which provides that, in a patent infringement case, a trial court "may increase the damages up to three times the amount found or assessed." "The decision to increase damages is committed to the discretion of the trial judge. . . ." *Modine*, 917 F.2d at 543. However, "[a] finding of willful infringement merely *authorizes*, but does not *mandate*, an award of increased damages." *Rite-Hite Corp. v. Kelley Co., Inc.*, 819 F.2d 1120, 1126 (Fed. Cir. 1987). This was clearly an exceptional and hard-fought case with a great deal of personal animosity expressed by certain of Lubrizol's counsel. However, damages have not yet been determined, and the Court finds that a ruling on enhancement at this point in time would be premature.

Plaintiffs have also moved that sanctions be imposed against Defendant in addition to an award of attorneys' fees under 35 U.S.C. § 285 as a punishment for Lubrizol's abuse of the federal courts. Trial in this matter was bifurcated and is not yet complete. The Court finds that a review of the merits of Plaintiffs' motion at this point in the litigation could result in a duplication of efforts, and that a ruling on sanctions would best be made once litigation is complete. Therefore, the motion for sanctions is being denied at this time subject to being reurged after the conclusion of the trial on damages.

Finally, Plaintiff requests that the Court utilize its inherent power and award attorneys' fees and impose additional sanctions against Defendant to restore equity. The attorneys' fees and costs awarded pursuant to 35 U.S.C. § 285 are more than adequate to restore equity and hopefully ensure that such abuses are not repeated. Based on the above, it is

ORDERED that Plaintiffs' motion for attorneys' fees (entry 481) is GRANTED and Plaintiffs shall recover

reasonable fees in the amount of $17,890,557.38 and costs of $235,693.11. It is further

ORDERED that Plaintiffs' motion for sanctions (entry 481) is DENIED subject to being reurged after the trial on damages and a final judgment entered. It is further

ORDERED that Plaintiffs' motion for enhancement of damages is DENIED subject to being reurged. Again the Court finds it would be best to consider this motion once the trial process is complete. It is further

ORDERED that Plaintiffs' motion for recovery of attorneys' fees and related costs and expenses (entry 422) which was filed prior to trial is MOOT based on the ruling on the motion for attorneys' fees filed after the trial on liability. It is further

ORDERED that Plaintiff's motion to enforce this Court's instructions concerning submission of attorneys' fees (entry 497) is MOOT. It is further

ORDERED that the parties abide by the following schedule: all motions must be filed and discovery on damages completed by June 1, 1993; the joint pretrial order shall be filed on or before July 5, 1993 and is limited to a total of thirty pages; and the remainder of this case is set for docket call on August 30, 1993 in Courtroom 11B, United States Courthouse, 515 Rusk, Houston, Texas.

IT IS SO ORDERED.

Signed this 17th day of February, 1993 at Houston, Texas.

s/Norman Black
NORMAN W. BLACK
CHIEF JUDGE

ENTERED FEB. 17 1994

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

EXXON CHEMICAL PATENTS, INC., EXXON CORPORATION, and EXXON RESEARCH & ENGINEERING COMPANY,	§	
Plaintiffs,	§	
VS.	§	CIVIL ACTION
	§	NO. H-89-3203
THE LUBRIZOL CORPORATION,	§	
Defendant.	§	

MEMORANDUM AND ORDER

Following a bifurcation of this case, a final judgment on liability was signed on February 5, 1993, and an order signed on February 17, 1993 awarded Plaintiffs ("Exxon") attorneys' fees of $17,890,557.38 and costs of $235,693.11. Both the judgment on liability and order granting the motion for attorneys' fees were duly entered.

Now that a trial on the issue of damages has resulted in a jury verdict finding Exxon to have been damaged in the amount of $48,000,000, Exxon has moved for the award of attorneys' fees incurred after the liability trial; for prejudgment interest; and for enhanced damages under 28 U.S.C. § 284.

Both Exxon and Defendant ("Lubrizol") have thoroughly briefed the issues, and the Court heard oral arguments on February 11, 1994.

I. ENHANCEMENT OF DAMAGES

Exxon is seeking $144,000,000 in damages exclusive of attorneys' fees and costs as authorized by the laws relating to patents and not as a sanction.

Since the Court has already found willful infringement and bad faith, an award of enhanced damages is permitted. *Beatrice Foods Co. v. New England Printing and Lithographing Co.*, 923 F.2d 1576 (Fed. Cir. 1991). The statute, 28 U.S.C. § 284, which authorizes enhancement has been held to be a matter of discretion and to be based upon the nine factors in *Read Corp. v. Portec, Inc.*, 970 F.2d 816 (Fed. Cir. 1992):

1. WHETHER LUBRIZOL DELIBERATELY COPIED EXXON'S PATENT.

Despite Lubrizol's attempts to prove otherwise at trial, this case contained an unusual "smoking gun." After Exxon obtained its European patent for its copper-containing formulation, a Lubrizol memo with a copy of that patent contained language indicating a plan to "exploit" the process in the United States. The memo contains references to Lubrizol ingredients which mimic the Exxon components. Before Exxon showed that copper could be an anti-oxidant, Lubrizol considered it an oxidant, and the effectiveness of Exxon's formulation was a surprise.

2. WHETHER LUBRIZOL INVESTIGATED THE SCOPE OF EXXON'S PATENT AND FORMED A GOOD-FAITH BELIEF THAT IT WAS INVALID OR THAT LUBRIZOL'S FORMULATION DID NOT INFRINGE.

The jury in the liability trial did not believe Lubrizol's story that it relied on opinions of counsel. The opinions of both Dr. Boisselle and Mr. Pindar, Lubrizol experts, showed that as early as 1985, Lubrizol knew the problems caused by the Exxon patent and substantially ignored the advice of counsel. At trial, Lubrizol tried to argue that its products did not contain ashless dispersants and that Exxon's patent was directed to a composition defined by its final components rather than starting ingredients. This "in-the-pot" argument was contrary to Dr. Pindar's "infringement chart." Lubrizol did not even obtain Dr. Boisselle's opinion on the '890 patent until 18 months after the suit was filed.

3. LUBRIZOL'S CONDUCT AS A PARTY TO THE LITIGATION.

The Court's order of February 17, 1993 makes it clear that Lubrizol exceeded the bounds of adversarial litigating at every turn through the conclusion of the liability phase of this suit. They dragged into the case numerous red herrings, including attempts to smear Exxon with irrelevant engine-test problems; stretched the discovery to unreasonable lengths; and misrepresented the law to the Court.

4. SPECIFICATIONS OF LUBRIZOL'S DISCOVERY ABUSES.

Both the trial judge and the magistrate judge found that Lubrizol engaged in obstructive behavior prior to the liability trial. Counsel made unnecessary and lengthy objections and interjections during depositions and made so many excessive discovery requests that the cost and delay was substantial. Lubrizol's accounting expert, Mr. Miller, and their marketing

expert, Mr. Long, even contradicted each other on the proper method for analyzing cost data on comparable products. Lubrizol made many unnecessary objections, for example, complaining about a definition of "power of incumbency" when they had used that exact term in their own 1992 annual report.

The Court feels that Lubrizol's liability-trial counsel misrepresented patent law in their first proposed charge on the law and in their statement of the state of the law concerning a stay pending appeal. Exxon continuously showed that the statements of the law set out by Lubrizol in this District were diametrically opposed to Lubrizol's statement of the law in prior litigation with Exxon.

The Court finds that other examples set out in Exxon's damages trial brief were true. It was especially egregious for Lubrizol to make a key issue out of the fact that Exxon did not report every engine-test failure when that should never have been an issue. Both Exxon and Lubrizol were dropping certain failed tests, and it was legitimate for both to do so.

5. A COMPARISON OF RELATIVE SIZE OF THE PARTIES.

In considering how multiplying the damages would affect Lubrizol, the Court notes that Lubrizol sold over $333,000,000 of infringing products and had total revenues in 1992 of over $1.5 billion. Its net income was over $124,000,000.

6. THIS WAS NOT A CLOSE CASE.

The case was subjected to extremely thorough discovery and was presented to the jury fully and completely. The jury spent three hours finding willful infringement and bad faith, and the verdict was well supported by the evidence and the weakness of Lubrizol's defenses.

7. LUBRIZOL'S INFRINGEMENT INCREASED AFTER THE LIABILITY VERDICT.

Lubrizol sold infringing products for more than three years after suit was filed, and substantially increased its production after the verdict and before the injunction issued. That conduct further justifies enhancement. *Bott v. Four Star Corp.*, 807 F.2d 1567 (Fed.Cir.1986).

8. LUBRIZOL TOOK NO REMEDIAL ACTION.

Instead of switching to non-infringing formulations after suit was filed, Lubrizol continued to use Exxon's formulation and produced marketing material claiming that those products were the cornerstone of its product line.

9. LUBRIZOL WAS MOTIVATED TO HARM EXXON.

Lubrizol claimed at the trial on damages that it could have used non-infringing products instead of Exxon's formulation at little additional cost, but instead continued to infringe. If Lubrizol had not set out to harm Exxon, it would have not engaged in the costly and obstructive discovery and conflicting pleading of contradictory theories which this case contained. Lubrizol showed no motive for its conduct *other* than to harm its major competitor, the Paramins division of Exxon.

10. LUBRIZOL ATTEMPTED TO HIDE ITS MISCONDUCT.

After deciding to "exploit" Exxon's patent, Lubrizol tried to hide that conduct by seeking to exclude the memo by a motion in limine and by dropping copying from its proposed jury charge. It created an unsupportable theory that it had not copied because it used a different copper compound even though the U.K. patent application referenced the same copper compounds used by both Exxon and Lubrizol. Lubrizol's "in-the-pot" argument was a transparent attempt to conceal its

copying, and Lubrizol's entire confusing approach to claim interpretation was a subterfuge.

The Court finds that an enhancement of $48,000,000 is fair, reasonable, and appropriate.

II. ATTORNEYS' FEES AND COSTS

Exxon seeks recovery of $4,462,944 in attorneys' fees, expenses of $1,392,649 and taxable costs of $37,037 in addition to the sums already awarded by the Court's previous order.

Exxon has submitted as an exhibit an itemization of the hours and hourly rates of Baker & Botts and Fitzpatrick, Cella, Harper & Scinto. The former had seven partners, sixteen associates, and a number of legal assistants working on the damages phase of this case excluding the hours covered by the previous award and hours spent on the appeal of the liability judgment. The latter firm had four partners, six associates, and a number of paralegals working on the same phase also excluding hours covered by the previous award and hours spent on the appeal of the liability judgment. The schedule is attached to this order, and the Court finds that the hours and hourly rate were reasonable and necessary considering the complexity of the damages case; the delay and obfuscation by Lubrizol; and the importance of this litigation. The costs and expenses as well as taxable costs were reasonable.

The time records of both Exxon and Lubrizol are sealed and made a part of the record.

III. PREJUDGMENT INTEREST

Exxon is not seeking an award of prejudgment interest on its attorneys' fees, and the court is ordinarily to award prejudgment interest on actual damages. *Lam, Inc. v. Johns-*

Manville Corp., 718 F.2d 1056 (Fed.Cir.1983). Lubrizol has not shown an adequate basis for not awarding such interest.

The Court has wide latitude in determining the interest rate and the frequency of compounding. *Uniroyal, Inc. v. Rudkin-Wiley Corp.*, 939 F.2d 1540, 1545 (Fed. Cir. 1991).

The Court ueems it proper to apply the prime rate compounded quarterly. It is, therefore,

ORDERED that a final judgment reflect the results of this memorandum. It is

ORDERED that the trial transcripts no longer be restricted.

Signed this 15th day of February, 1994 at Houston, Texas.

s/Norman Black
NORMAN W. BLACK
CHIEF JUDGE

[Schedule of Attorney Hours and Hourly Rates Omitted.]

ENTERED FEB. 17 1994

IN THE UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
HOUSTON DIVISION

EXXON CHEMICAL PATENTS, INC., EXXON CORPORATION, and EXXON RESEARCH & ENGINEERING COMPANY,	§	
Plaintiffs,	§	
VS.	§	CIVIL ACTION
	§	NO. H-89-3203
THE LUBRIZOL CORPORATION,	§	
Defendant.	§	

FINAL JUDGMENT ON DAMAGES

On November 18, 1993, the Jury returned its verdict on the Court's written question. On the basis of the Jury's finding, the evidence at trial, the findings of the Court and the applicable law,

It is ORDERED that

1. Plaintiffs shall recover actual damages of $48,000,000,

2. Plaintiffs shall recover enhanced damages of $48,000,000, and

3. Plaintiffs shall recover their attorneys' fees, expenses, and costs of court, of $5,892,630 in addition to the sums

already ordered on February 17, 1993 of $17,890,557.38 in fees, and $235,693.11 in costs, and

4. Plaintiffs shall recover $8,768,459 in prejudgment interest on the actual damages awarded by the Jury.

IT IS SO ORDERED.

Signed this 15th day of February, 1994 at Houston, Texas.

s/Norman Black
NORMAN W. BLACK
CHIEF JUDGE

United States Court of Appeals for the Federal Circuit

93-1275, 94-1309

EXXON CHEMICAL PATENTS, INC., EXXON CORPORATION and EXXON RESEARCH AND ENGINEERING CO.,

Plaintiffs-Appellees,

v.

LUBRIZOL CORPORATION,

Defendant-Appellant.

Appealed from: U.S. District Court for the Southern District of Texas

Judge Black

ORDER

A combined petition for rehearing and suggestion for rehearing in banc having been filed by the appellee, and a response thereto having been invited by the court and filed by the appellant, and the petition for rehearing having been referred to and acted upon by the panel that heard the appeal, and, thereafter, the suggestion for rehearing in banc, the response and a reply to the response, having been referred to the judges authorized to request a poll whether to rehear the appeal in banc, and a poll having been requested, taken, and failed, it is

ORDERED that the petition for rehearing be, and the same hereby is DENIED; and it is further

ORDERED that the suggestion for rehearing in banc be, and the same hereby is, DECLINED.

Circuit Judge Mayer concurs in a separate opinion.

Circuit Judge Clevenger, with whom Circuit Judge Plager joins, concurs in a separate opinion.

Circuit Judge Newman dissents in a separate opinion.

Chief Judge Archer, Circuit Judge Rich, and Circuit Judge Schall did not participate in the poll.

FOR THE COURT,
FRANCIS X. GINDHART, CLERK

February 23, 1996 By Diane M. Frye
Chief Deputy Clerk

cc: S. Leslie Misrock
William C. Slusser
Donald R. Dunner

MAYER, *Circuit Judge*, concurring.

This is another example of the predicted mischief of *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 34 USPQ2d 1321 (Fed. Cir.), *cert. denied*, 116 S. Ct. 40 (1995). Two judges have divined an interpretation of the claim that occurred to no one else in this extensive litigation. None of the parties or the trial court offered the interpretation that these two judges chose, and none of the extensive evidence about how those skilled in the art would understand the claim supports it. After *Markman*, apparently the meaning of a claim has very little to do with the parties' theories of the case and the record made in support, and everything to do with what at least two judges here prefer regardless of the record.

CLEVENGER, *Circuit Judge*, with whom PLAGER, *Circuit Judge*, joins, concurring in the court's denial of the petition for rehearing in banc.

Because more than twelve thousand pages will separate the decision of the court in this case, found at 64 F.3d 1553 (Fed. Cir. 1995), from the comments of Judges Newman and Mayer, we shall quickly bridge the gap to ease the mind of any concerned reader.

Judge Newman's general views on how to read the claims in suit reduce themselves to a simple proposition. Although Exxon's patent is on a specifically defined chemical product (a "lubricating oil composition suitable as a crankcase lubricant"), Judge Newman treats Exxon's claims differently, as if they were drawn to a formula (or recipe) for making whatever product results from mixing the ingredients named in the formula. Were such the case, Exxon would have won on its proofs in this case. Instead, Exxon sued Lubrizol on a chemical product claim. To win, Exxon had to prove that Lubrizol's product contains, in the specific amounts stated in the patent, the chemicals named in Exxon's patented formula.

Although Exxon proved that Lubrizol's product contained the named chemicals, it failed to prove that those chemicals are present in Lubrizol's product in the specific required amounts. So Exxon lost.

The basic claim interpretation theory adopted by the court was put forth by Lubrizol in its defense to Exxon's suit, as explained in the court's opinion, which amply demonstrates the respects in which our colleagues have misread the opinion and the record in this case.

NEWMAN, *Circuit Judge*, dissenting from the denial of rehearing *en banc*.

The court's decision in the case of *Exxon Chem. Patents, Inc. v. Lubrizol Corp.*, 64 F.3d 1553, 35 USPQ2d 1801 (Fed. Cir. 1995), creates important new law governing the claiming of chemical compositions. Adopted by split panel decision, it is gravely incorrect. It is incorrect as a matter of law, as a matter of chemistry, and as a matter of patent practice. The panel majority's new rule of "claim construction" will cast a cloud upon many thousands of existing patents, and major classes of chemical invention will confront unclear, unnecessary, confusing, expensive, and perhaps impossible scientific requirements.

The panel majority holds that a claim to a chemical formulation composition can not be infringed if there is interaction between any of the ingredients after they are added to the composition, such that any ingredient changes in chemical form or ratio from that listed in the claim. Thus any chemical change or interaction within the composition, even loose "complexing" as appears to happen between ingredients of this composition, renders the claim useless. The panel majority holds that it does not matter that the Lubrizol composition is identical to the claimed composition; the

purported changes inside the composition after it is made is held by the panel majority to negate infringement.

This is a new and incorrect rule of claim construction. It is not necessary to state the myriad interactive changes that occur in chemical solutions or dispersions, in order to describe this lubricant formulation clearly and unambiguously. Many thousands of chemical patents are written in the simple combination style here found fatally wanting. Consider Exxon's claim 1 shows in the margin,[1] a straightforward list

---

[1] 1. A lubricating oil composition suitable as a crankcase lubricant in internal combustion engines comprising:

A. a major amount of lubricating oil;

B. a dispersing amount of lubricating oil dispersant selected from the group consisting of:

(1) ashless nitrogen or ester containing dispersant compounds selected from the group consisting of:

(a) oil soluble salts, amides, imides, oxazolines, esters, and mixtures thereof, of long chain hydrocarbon substituted mono- and discarboxylic acids or their anhydrides;

(b) long chain aliphatic hydrocarbons having a polyamine attached directly thereto; and

(c) Mannich condensation products formed by condensing about a molar proportion of long chain hydrocarbon substituted phenol with from about 1 to 2.5 moles of formaldehyde and from about 0.5 to 2 moles of polyalkylene polyamine; wherein said long chain hydrocarbon group is a polymer of a C_2 to C_3 monoolefin, said polymer having a molecular weight of from about 700 to about 5000;

(2) nitrogen or ester containing polymeric viscosity index improver dispersants which are selected from the group consisting of:

(a) polymers comprised of C_4 to C_{24} unsaturated esters of vinyl alcohol or of C_3 to C_{10} unsaturated mono- or dicarboxylic acid with unsaturated nitrogen containing monomers having 4 to 20 carbons.

(b) copolymers of C_2 to C_{20} olefin with C_3 to C_{10} mono- or dicarboxylic acid neutralized with amine, hydroxy amine or alcohols, and

of the ingredients of the composition, all of which are known lubricating oil additives except the copper component, which is listed at "D" in the claim.

Most or all chemicals interact to some extent in solution, wherein ions and molecules rearrange based on forces of various kinds. Under the court's new law, table salt dissolved in water will not be an adequate description of the composition for infringement purposes, since the sodium chloride molecule no longer "exists": in dissolution the sodium and chloride ions will have broken their bonds to each other, in interaction with molecules of water. For the Exxon lubricant composition the interactions in the pot were exceedingly complex. However, like salt in water, there is no uncertainty as to what was made and what was infringed. When the invention is adequately described and claimed by

---

(c) polymers of ethylene with a C_3 to C_{20} olefin further reacted either by grafting C_4 to C_{20} unsaturated nitrogen containing monomers thereon or by grafting an unsaturated acid onto the polymer backbone and then reacting said carboxylic acid groups with amine, hydroxy amine or alcohol; and

(3) mixtures of (1) and (2); wherein when said lubricating oil dispersant (1) is present, then said dispersing amount of (1) is about 1 to 10 wt. %, and when said lubricating oil dispersant (2) is present, then said dispersing amount of (2) is from about 0.3 to 10 wt. %;

C. from about 0.01 to 5.0 parts by weight of oil soluble zinc dihydrocarbyl dithiophosphate wherein the hydrocarbyl groups contain from 1 to 18 carbon atoms;

D. an antioxidant effective amount, within the range of from about 5 to about 500 parts per million by weight, of added copper in the form of an oil soluble copper compound; and

E. a lubricating oil detergent additive which comprises at least one magnesium or calcium salt of a material selected from the group consisting of sulfonic acids, alkyl phenols, sulfurized alkyl phenols, alkyl salicylates and naphthenates, wherein said parts by weight are based upon 100 parts by weight of said lubricating composition and said weight % is based on the weight of said lubricating composition.

listing the ingredients of the composition, and is understood by persons of skill in the field of the invention, the law demands no more. To require inventors to identify and include in their claims the chemical interaction products formed in such a complex mixture is not necessary in order distinctly to state what the inventor regards as his invention. 35 U.S.C. § 112, ¶2:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

The court's holding that a chemical composition claim that is written by listing the ingredients can not be enforced against the identical composition made by combining the identical ingredients in the identical ratio, unless none of the ingredients interact when they are placed together, is simply bad law. It is without precedent, and it is contrary to the way that chemical formulation composition claims are understood within the chemical and the legal communities. This *sua sponte* transformation of the patent law does not bode well for this court's implementation of its *Markman* role as *de novo* construer of patent claims.

Despite the serious disruption of chemical patent-dependent activity flowing from this decision and the massive taint upon existing property rights, the court has declined *en banc* review. Thus I write to explain why I believe that the panel majority has made an error of major consequence, an error that transcends the interests of these parties and this patent.

Chemical Formulation Compositions Are Correctly Claimed by Their Ingredients

The standard way of claiming chemical compositions is by their ingredients. Naming the chemicals and their amounts is

the clearest, most accurate, and most comprehensive way of describing such inventions. Often there is no other way of describing chemical compositions. In Robert C. Faber, *Landis on Mechanics of Patent Claim Drafting* (3d ed. 1990) the author explains the pervasiveness of this type of claim in chemical inventions:

> As in the other classes, *most composition claims are combination claims* except where a new compound or molecule per se is claimed.
>
> ****
>
> Composition of matter claims *list the chemical ingredients (compounds, elements, or radicals) making up the composition* or compound. The ingredients or elements may be claimed narrowly (specific named components), with intermediate scope (a group of similar elements functionally equivalent), or broadly as to function performed, where the prior art permits. Where necessary to novelty, etc., the proportions or other conditions or parameters of the compound are stated, usually in ranges of concentration of ingredients.

Id. at 145, 148 (emphasis added). Chemical compositions that are mixtures of ingredients are routinely claimed by listing the ingredients. Such a composition is easy to describe with precision, easy to search and to examine for patentability, easy to understand, and unambiguous in content and scope. Whether there is interaction among the ingredients after they are placed in the container does not affect the specificity of the description of what has been invented. It is not necessary to know what physical or chemical interactions occur in the container in order to describe this invention, which resides in the combination of listed ingredients.

The law requires that the claims "reasonably apprise those skilled in the art both of the utilization and scope of the invention," and that "the language is as precise as the subject

matter permits." *Shatterproof Glass Corp. v. Libbey-Owens Ford Co.*, 758 F.2d 613, 624, 225 USPQ 634, 641 (Fed. Cir. 1985). That requirement was plainly met by the claims in suit, for they were written as lubricant formulators would write them and understand them, by listing the ingredients of the composition. Whatever the scientific nature of the chemical interactions inside the container, the established and probably only way of describing such formulations is by their ingredients. The court creates a scientific burden that is totally unnecessary and perhaps impossible[2] to meet. There was extensive evidence at trial, presented by witnesses on behalf of both Exxon and Lubrizol, concerning what happens when these ingredients are put in the same container. Noted scientists debated the issue. The trial judge recognized that it was not possible to know what was happening inside the pot.

The court's holding that such claims are not infringed if changes occur within the composition after the ingredients are combined, simply means that such compositions can no longer be patented in this way. The court's requirement that the patentee must state in the claim the products of chemical interaction that occur in the mixing pot, simply means that failure to do so leaves a useless patent that can not be enforced against the identical composition made from the identical ingredients in the identical ratios.

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[2] Exxon's expert witness, Dr. Ingold, testified as to the scientific possibility of proving what the panel requires:

> Q. Do you know of any other technique which would allow a chemist to determine precisely what is going on with respect to these hand-holding type interactions [the witness' description of the loose bonds the parties referred to as complexing] in a modern motor oil package?
>
> A. Dr. Barrett, there is no such technique available today, nor is there any combination of techniques available today that would let one say what was present after you have mixed all four of those components.

The court's ruling will impose disorder and uncertainty upon many fields of applied chemistry, for this claim form is the standard way of claiming new formulation inventions. The treatises teach the routine nature of such claims, recognizing that the components of a chemical composition are not a "mere aggregation," but cooperate in "joint action":

> A composition or product is patentable when it involves (1) a new and useful result and this result is a product of the combination and *not the mere aggregation* of several results; (2) a different result in *the combined forces* or processes from that given by their separate parts and a new result is produced by their union; (3) a result which is not the mere aggregate of separate contributions but is due to the *joint and cooperating action* of all the elements; and (4) several elements which produce by their *joint action* a new and useful result.

3 Anthony W. Deller, *Patent Claims* (2d ed. 1971) § 456, at 48 (citing *Colgate-Palmolive Co. v. Carter Products, Inc.*, 230 F.2d 855 (4th Cir. 1956)) (emphasis added). Deller's and other treatises provide many examples of such compositions, all claimed by listing their ingredients.

I conducted a rough survey in the Official Gazette of the Patent and Trademark Office for December 26, 1995, which announced the issuance during the preceding week of 608 patents classified as "chemical." About a hundred of these patents were for chemical compositions that were claimed by listing their ingredients. For example, there were patents on a pollution control composition, a dye transfer inhibiting composition, a shampoo composition, a paint stripper composition, a polyol composition for polyurethane foams, a cold water detergent composition, a granular detergent composition, a wood preservative, an adhesive composition, photosensitive and radiation-sensitive resin compositions, an x-ray film developer composition, a radiation-absorbing glass

composition, and many more. All were claimed by listing the ingredients.

The invention of all such compositions is well described by the ingredients that are combined. Whatever interactions occur within the container holding the composition is irrelevant to the specificity and clarity of the claim and its understanding by persons in the field of the invention. The patent statute requires that the subject matter be described so that persons in the field know what has been invented. 35 U.S.C. § 112, ¶1:

> The specification shall contain a written description of the invention and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

It is basic chemistry that most organic and inorganic molecules when placed in solution interact in various ways. Such interactions may produce improved properties, thus providing the commercial value that inventors seek to secure through the patent system. Indeed, as stated by Deller in *Patent Claims, supra,* the patent office will not grant a patent on compositions where the properties are simply an aggregation of the known properties of the separate ingredients.

It was interesting to learn that the distinguished chemists who testified for both sides did not know with scientific certainty the interactions occurring in this complex lubricant formulation. The following exchange occurred during argument to the trial judge concerning "claim construction":

Exxon Counsel: . . . We have Dr. Ingold's testimony about them [the chemical ingredients] coming together and breaking apart. We have Dr. Schroeck admitting that was true. But under cross, he admitted yes, they break apart. These phantom compounds that nobody can find.

****

LeSuer, although Mr. Adelman didn't remember it, says I don't know exactly what this is but it is definitely a stable linkage.... That is totally different from Dr. Schroeck saying that they are breaking apart all the time and Dr. Cotton saying these compounds are going back and forth, they are complexing and uncomplexing.

****

District Court: ...I wanted to know if there is any way to find out what is in that composition, and you can't. Only a fool would try.

A lubricant composition described and claimed by listing the ingredients is appropriate to an invention that is indeed a combination of ingredients. A patent attorney testified that he has seen "literally thousands of lubricant patents" described and claimed, as in the Exxon patent in suit, by listing the ingredients. The panel majority's new requirement is contrary to chemical and practical reality, as is its speculation that Exxon could not prove infringement even under the court's new theory: the reason given for denying Exxon the chance to do so. Chemists know that all chemical reactions have a reaction time and a reaction threshold. Chemists understand the concepts of chemical reactivity and measurement of activity coefficients. Studies of chemical equilibria and thermodynamic principles as applied to chemical reactions, the basics of ionic forces in solution, and principles such as the

Law of Mass Action (relating chemical equilibrium and concentration), are elementary tools of classical chemistry. Chemists know that when chemicals are placed in solution or dispersion they interact with the solvent or dispersant; they may form new bonds, or respond to attractive or repulsive forces, or form loose or tight complexes, or be subject to a variety of other interactions, often a combination of interactions in dynamic equilibrium, in a constantly fluctuating swirl of chemical complexity. Dr. Ingold explained these interactions at the trial:

> And the thing to try and remember about this is these weak [interactions] can break apart quite easily. So that this association between the dispersants and some molecule X can simply come apart and give you the detergent again plus the molecule X in free solution. And X can, of course, recombine. And this can happen thousands of millions of times. You don't in any way destroy the molecule in the dispersant nor do you affect X.

He further explained these interactions as they occur among the constituents of the additive packages:

> Q Dr. Ingold, do all of these components interact in the same associated way that we have discussed for the ZDDP and the ashless dispersant? Do they all interact that way?
>
> A Yes, Dr. Barrett, they interact with one another. They also interact with themselves. Everything is interacting with everything else. It is associating. They are associating and breaking up. It is a grand mixture as the molecules come together and associate and then fall apart again and — or take a new partner and reassociate.

Dr. Cotton, Lubrizol's chemistry expert, analogized these kinds of bonds to a square dance, where molecules release one

partner and reattach to another and continue releasing and reattaching in a condition of equilibrium.

When the invention is the combination of ingredients, the occurrence of interactions in the pot does not defeat the adequacy of the description of the invention to persons in the art. The patenting of formulation compositions by identifying the components of the composition is legally sound, simple, and serviceable, and permits infringement or noninfringement to be readily determined, for it is necessary only to ascertain whether the listed ingredients are combined in the listed ratios.

The Patent Grant Encompasses Making, Using, or Selling the Patented Invention

The patent act states that "whoever without authority makes, uses, offers to sell or sells any patented invention," 35 U.S.C. § 271(a), infringes the patent. That statutory requirement is satisfied when the "recipe" of the claims is followed. Thus the panel majority has erred in applying the law, for the patented composition is made when the ingredients are combined.

The Exxon specification states that "modern lubricants are complex mixtures of various additives each serving a particular purpose." Col. 1 line 67 to col. 2 line 5. The specification describes the purpose of the various additives that are listed in the claim. It was testified at trial that the concern of lubricant formulators is "what goes into the pot," in the words at trial of Lubrizol's formulation chemist Dr. Salomon. An inventor need not understand the scientific mechanism in order to place an invention into the patent system. *See Newman v. Quigg*, 877 F.2d 1575, 1581, 11 USPQ2d 1340, 1345 (Fed. Cir. 1989) (observing that "it is not a requirement of patentability that an inventor correctly set forth, or even know, how or why the invention works"); *Fromson v. Advance Offset Plate, Inc.*, 720 F.2d 1565, 1570, 219 USPQ 1137, 1140 (Fed. Cir. 1983) ("[I]t is axiomatic that an

inventor need not comprehend the scientific principles on which the practical effectiveness of his invention rests."). The suggestion by the panel majority that Exxon's patent attorney did not know how to write claims is misdirected. These claims are written in the clearest, simplest, and most accurate way in which a formulation can be described: by listing the ingredients. I can discern no justification for the court's departure from this long-standing and reasonable claim practice.[3]

Indeed, the panel majority's concurring opinion suggests that if Exxon's ingredients remain sufficiently uncomplexed or unreacted for a period of time after mixing (an hour? a minute? a nanosecond?) the claim would be infringed even on the majority's interpretation. However, the majority denied Exxon the opportunity to prove such fact.

Justice Requires Remand When this Court Creates a New Law of Claim Construction

Having adopted a claim construction that neither party proposed and that is without legal precedent, the panel majority nonetheless declined the patentee's request for remand so that the patentee could present factual evidence or argument relevant to this new "law" as applied to this case.

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[3] The panel majority recognized that compliance with its new "law" of claim construction may not be scientifically feasible, and suggested that claim-writing gimmickry should have been invoked. Thus the panel majority proposes that a patentee might overcome the court's newly created obstacles with a "product-by-process" claim — although this invention is neither a process nor a product, but a mixture of ingredients to form a composition. I will not speculate on whether the court's ruling can be made less pernicious by creative claim-writing, or how the patent examining process will implement this new law governing composition claims.

Fair procedure has been compromised by the court's refusal to remand to the trial court for the presentation of evidence or argument on the new factual issues raised by this court's new law of claim construction. *See Weade v. Dichmann Wright & Pugh Inc.*, 337 U.S. 801, 808-09 (1949) (remand required to consider alternative theory of liability).

It is inappropriate for the appellate court to make its own scientific finding that such proof is not possible on the court's new criterion. Although the district court stated during discussion of the jury charge that what is in the composition can not be determined, *see supra*, apparently there was no discussion concerning whether there was a transient existence in the mixture of the uncombined ingredients, for that was not an issue. The district court did not discuss whether the "complexing and uncomplexing" described by Dr. Cotton, and the other interactions postulated by other witnesses, might permit the patentee to prove that the ingredients have at least a transient existence in the ratios stated in the claim. The rate of association or complexing is not discussed in the portion of the record provided us, and does not appear to have been at issue.

As a matter of procedural justice, a litigant is entitled to present its case when the court changes the law. *See Neely v. Martin K. Eby Constr. Co.*, 386 U.S. 317, 325 (1968) (appellate court "may not order judgment where ... the record reveals a new trial issue which has not been resolved"); *Brinley v. Commissioner of Internal Revenue*, 782 F.2d 1326, 1336 (5th Cir. 1986) (justice requires the opportunity to present evidence in light of new legal rule established on appeal). Although the appellate court need not remand for a futile trial, *Boyle v. United Technologies Corp.*, 487 U.S. 500, 513-514 (1988), it is apparent from the record that such a condition does not here exist. Thus, on the claim

construction of the panel majority,[4] the patentee is entitled to develop the facts for application of our new law. Even as this court declined to correct *en banc* the panel's claim construction, the case should have been remanded for application of this new rule of law to the evidence. Thus, respectfully, I dissent from the court's denial of rehearing *en banc*.

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[4] I can not reconcile the Response's suggestion of today that the theory it adopted was presented at the trial, with the statement in the majority opinion "that Exxon's preferred claim interpretation is incorrect, and that Lubrizol's is only partly correct." 64 F.3d at 1555, 35 USPQ2d at 1802.

5,478,385

SEALING COMPOSITIONS

James Washbourne, Long Handborough, England, assignor to Oxford Brookes University, Oxford, England **Filed Jan. 18, 1994, Ser. No. 183,409**
Claims priority, application United Kingdom, Jan. 15, 1993, 9300753
Int-Cl.[6] C09K *3/10;* C09D *191/06; 191/08*
U.S. Cl. 106--33 **19 Claims**

1. A sealing composition, comprising:

10-55% by weight of: a petroleum based wax; or hydrogenated vegetable oil; hydrogenated animal or fish oil, fat, or grease; or polyisobutane; or combinations thereof;

0.5-15% by weight of a lipophilic emulsifier;

an emulsion stabilizer or thickener;

a water gellant/viscosifier;

a void-blocking additive;

a corrosion inhibitor in an amount sufficient to minimize the possibility of corrosion of ferrous metallic compounds with which the sealing composition makes contact; and

at least 20% by weight water, in an amount sufficient to inhibit combustion of the sealing composition.

Reproduced from: 1181 Off. Gaz. Pat. Office 2472 (1995).

5,478,389

POLLUTION REMEDIAL COMPOSITION AND ITS PREPARATION

Richard E. Loomis, Texarkana, Ark., assignor to Loomis Family Trust, Texarkana, Ark.

Continuation of Ser. No. 766,424, Sept. 25, 1991, abandoned.

This application Apr. 28, 1994, Ser. No. 234,273

Int. Cl.[6] **C09K** *3/32;* **B01J** *13/00;* **C04B** *18/04;* **C11D** *3/36*

U.S. Cl. 106--630 **27 Claims**

1. A pollution remedial composition comprising:

from about 40 to about 75 volume % of a soluble silicate;
from about 0.25 to about 5 volume % of a surfactant;
from about 1 to about 5 volume % of a polyol; and
the remainder water.

26. A pollution remedial composition comprising:

about 57.5 volume % of sodium silicate;
about 0.5 volume % of an ester of organo-phosphoric acid; about 1.5 volume % of ethylene glycol;
about 0.25 weight % of sodium chloride;
about 0.25 weight % of citric acid; and
the remainder water.

Reproduced from: 1181 Off. Gaz. Pat. Office 2473 (1995).

5,478,489

DYE TRANSFER INHIBITING COMPOSITIONS COMPRISING BLEACHING AGENTS AND A POLYAMINE N-OXIDE POLYMER

Abdennaceur Fredj, Brussels, Belgium; James P. Johnston, Overijse, United Kingdom, and Christiaan A. J. Thoen, Haasdonk, Belgium, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jan. 17, 1995, Ser. No. 373,197

Claims priority, application European Pat. Off., Jul. 15, 1992, 92202168; Nov. 6, 1992, 92870181; May 26, 1993, 93201198; Jun. 9, 1993, 93870195

The Portion of the term of this patent subsequent to Oct. 17, 2012, has been disclaimed.

Int. Cl.[6] **C11D** *3/37;3/39;3/395;* **D06L** *3/02*

U.S. Cl. 252--99 **15 Cl**

1. A dye transfer inhibiting composition for use in aqueous wash solutions comprising

(a) a dye transfer inhibiting amount of poly(4-vinylpyridine-N-oxide) having ratio of amine to amine N-oxide of from about 2:3 to about 1:1,000,000; and

(b) a cleaning effective amount of a bleaching agent selected from percarboxylic acids, halogen bleaching agents, perborates, persulfates, percarbonates, peroxydisulfates, perphosphates, peroxyhydrates, bleach activators, hydrogen peroxide-generating enzymes, enzymes, non-oxygen-type bleaching agents, or mixtures thereof.

8. A detergent composition which comprises a dye transfer inhibiting composition according to claim **1** further comprising one or more of the following ingredients: surfactants, builders, chelants, suds suppressor, soil release agents, antiredeposition agents, optical brighteners, abrasives,

bactericides, tarnish inhibitors, coloring agents, perfumes, or mixtures thereof.

Reproduced from: 1181 Off. Gaz. Pat. Office 2504 (1995).

5,478,494

POLYOL COMPOSITION HAVING GOOD FLOW AND FORMIC ACID BLOWN RIGID POLYURETHANE FOAMS MADE THEREBY HAVING GOOD DIMENSIONAL STABILITY

Thomas B. Lee, Southgate; Thomas L. Fishback, Gibraltar;
Curtis J. Reichel, Southgate, and Donald L. Christman, Grosse Ile, all of Mich., assignors to BASF Corporation, Mt. Olive, N.J.

Filed: Sep. 22, 1993, Ser. No. 125,464
Int. Cl.[6] C08J *9/08;* **C08G** *18/18;18/20;18/48*
U.S. Cl. 252--182.25 **45 Claims**

1. A polyol composition comprising a polyol component, said polyol component comprising:

a) a polyoxyalkylene polyether polyol having an equivalent weight of 130 or less, and an average functionality of 3.1 or greater;
b) a polyoxyalkylene polyether polyol having an average functionality of 1.8 to less than 3.1, a viscosity of 800 cP or less at 25°C., and an equivalent weight within the range of from greater than 130 to 1500;
c) a polyoxyalkylene polyether polyol having an average functionality of greater than 3.1 and an equivalent weight of greater than 130.

Reproduced from: 1181 Off. Gaz. Pat. Office 2505 (1995).

5,478,552

LIQUID COSMETIC COMPOSITION

Tomoko Hasegawa, Maebashi, Japan, assignor to Mitsubishi Pencil Kabushiki Kaisha, Tokyo, Japan

Filed: Jul. 7, 1994, Ser. No. 271,857

Claims priority, application Japan, Jul. 16, 1993, 5-177031

Int. Cl.[6] **A61K** *7/021;7/025;47/00*

U.S. Cl. 424--63 **9 Claims**

1. A liquid cosmetic composition comprising from 0.2 to 50 parts, by weight, of trimethylsiloxysilicic acid, from 5 to 80 parts, by weight, of a volatile silicone, from 1 to 20 parts, by weight, of a sucrose fatty acid ester selected from the group consisting of monoesters, diesters, triesters, tetraesters, pentaesters, hexaesters, heptaesters, octaesters, and mixtures thereof the fatty acids in said esters being selected from saturated and unsaturated fatty acids having from 1 to 28 carbon atoms; and a member selected from the group consisting of silicic anhydride having hydrophobic-treated surface, a clay mineral having organic-treated surface and mixtures thereof, the liquid cosmetic composition having a viscosity of 100,000 cp or less.

Reproduced from: 1181 Off. Gaz. Pat. Office 2523 (1995).

5,478,556

VACCINATION OF CANCER PATIENTS USING TUMOR-ASSOCIATED ANTIGENS MIXED WITH INTERLEUKIN-2 AND GRANULOCYTE-MACROPHAGE COLONY STIMULATING FACTOR

Robert L. Elliott, 17310 Masters Pointe Ct., Baton Rouge, La. 70810 and Jonathan F. Head, 6144 Hagerstown Dr., Baton Rouge, La. 70817

Filed: Feb. 28, 1994, Ser. No. 202,516

Int. Cl.[6] **A61K** *45/05;39/00;* **C07K** *14/535;14/55*

U.S. Cl. 424--852 **3 Claims**

2. A breast tumor vaccine comprising:

a suspension of a tumor associated antigen from a human breast tumor;

one million colony forming units of granulocyte-macrophage colony stimulating factor; and

ten thousand international units of interleukin 2.

Reproduced from: 1181 Off. Gaz. Pat. Office 2524 (1995).

5,478,565

TREATMENT OF SINUS HEADACHE

Navin M. Geria, Warren, N.J., assignor to Warner-Lambert Company, Morris Plains, N.J.

Filed: Mar. 27, 1990, Ser. No. 500,610

Int. Cl.[6] A61K *9/12*

U.S. Cl. 424--434 **13 Claims**

1. A topically applicable nasal composition capable of relieving mammalian sinus headache which comprises (i) an anaesthetically effective amount of an acid addition salt of dyclonine or pramoxine and (ii) an adrenergically effective amount of an acid addition salt of a sympathomimetic amine decongestant selected from the group consisting of an arylalkylamine, imidazoline and a cycloalkylamine incorporated in a pharmaceutically acceptable carrier.

Reproduced from: 1181 Off. Gaz. Pat. Office 2525 (1995).

5,478,587

DESSERT COMPOSITION

Armand Mingione, Escondido, Calif., assignor to Henry G. Kohlmann

Filed: Aug. 20, 1993, Ser. No. 109,707

Int. Cl.[6] A23G *9/02*

U.S. Cl. 426--565 **34 Claims**

1. A non-dairy composition useful in the preparation of a frozen dessert containing a non-dairy creamer comprising:

(a) from about 14.00% to 78.26% by dry weight of a non-dairy creamer,

(b) from about 3.48% to 52.17% by weight of a sweetener,

(c) from about 2.5% to 42.98% by weight of a filler,

(d) from about 0.14% to 6.96% by weight of a stabilizer, and

(e) from about 0.01% to 0.29% by weight of a smoother.

Reproduced from: 1181 Off. Gaz. Pat. Office 2531 (1995).

5,478,706

ALKALINE BLACK-AND-WHITE DEVELOPER FOR SILVER HALIDE PHOTOGRAPHIC MATERIAL

Carlo Marchesano; Filippo Faranda, both of Savona, and Franco Buriano, Carcare, all of Italy, assignors to Minnesota Mining And Manufacturing Company, St. Paul, Minn.

Contination of Ser. No. 858,313, Mar. 25, 1992, abandoned.

This application Mar. 3, 1994, Ser. No. 206,196

Claims priority, application Italy, Apr. 3, 1991 MI91A0925

Int. Cl.[6] G03C *5/46*

U.S. Cl. 430--486 **21 Claims**

1. An alkaline black-and white x-ray film photographic developer composition having a pH of greater than 10 comprising:

(1) 2 to 100 grams per liter of at least one black-and-white developing agent,

(2) 0.1 to 20 grams per liter of at least one black-and-white auxiliary developing agent,

(3) 0.01 to 5 grams per liter of at least one antifoggant,

(4) 1 to 60 grams per liter of at least one sequestering agent,

(5) a sulfite antioxidant capable of generating 0.1 to 1.25 moles per liter of sulfite ions,

(6) at least one buffering agent in a molar ratio of greater than 0.5:1 with respect to said sulfite antioxidant,

(7) a tone agent,

(8) a tone promoting agent, wherein said tone agent is 1 x 10^{-3} to 2 moles per liter of a primary organic amine compound and said tone promoting agent is 0.01 to 50 mMoles per liter of a silver halide solvent.

Reproduced from: 1181 Off. Gaz. Pat. Office 2560 (1995).

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Alyeska Pipeline Service Company

AquaAir, Inc.
Aramco Services Company
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Awaji Gas Nenryo Kabushiki Kaisha
Azuma Sekiyu K.K.
BEB Erdgas und Erdoel GmbH, Hannover
BFS Berlin Fuelling Services GbR
BRIGITTA Erdgas und Erdoel GmbH, Hannover
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Cerafilter Systems, L.P.
Changi Airport Fuel Hydrant Installation Pte. Ltd.
Changi Into-Plane Services (Pte) Ltd.
Chuo Sekiyu Hanbai K.K.
Compagnie Industrielle des Polyethylenes de Normandie, GIE
Compania Minera Disputada de Las Condes S.A.
Comptoir Auxiliaire du Petrole
Comptoir Oyonnaxien des Combustibles (C.O.C.)
Computer Centrum Groningen B.V.
Cynthia Gas Gathering Company Limited
DFTG Deutsche Fluessigerdgas Terminal GmbH
Daihatsu Sekiyu K.K.
Daito Gas K.K.
Depot Petrolier du Gresivaudan
Depots Petroliers de la Corse
Depots de Petrole Cotiers
Deudan-Holding GmbH
Deutsche Advanced Elastomer Systems GmbH
Deutsche Erdgas Transport G.m.b.H.

Deutsche Transalpine Oelleitung G.m.b.H.
Devon Estates Limited
Disma S.r.l.
Dixie Pipeline Company
E S F Limited
EPDMCO, L.P.
ETD Tankdienst Gesellschaft Duesseldorf GbR
Eagle Kenso K.K.
Eagle Reinsurance Co. Ltd.
East Asia Response Private Limited
East Texas Salt Water Disposal Company
Eastern Canada Response Corporation Ltd.
Eco Lubrifiants
Eiko Sekiyu K.K.
Elwerath Erdgas und Erdoel GmbH, Hannover
Elwerath Erdoel und Erdgas AG
Emirates National Chemicals Company Ltd.
Emori Sekiyu K.K.
Emsland-Erdoelleitung G.m.b.H.
Energie Marketing Services GmbH
Enterprise Housing Partners 1992 Limited Partnership
Entrepot Petrolier de Mulhouse (E.P.M.)
Erdgas-Verkaufs-Gesellschaft m.b.H.
Erdoel-Raffinerie Deurag-Nerag GmbH
Esso (Overseas) Pension Trust Limited
Esso Antilles-Guyane, S. A.
Esso Energie G.I.E.
Esso Exploration and Production Angola Inc.
Esso Exploration and Production Ireland Limited
Esso France S.A.
Esso Lub'Services
Esso Malaysia Berhad
Esso Raffinage S.A.F.
Esso Societe Anonyme Francaise
Esso Standard Thailand Ltd.
Esso Standard Tunisie S. A.

Esso Technologies et Services (E.T.S.)
Etablissements Cloarec
Exxon Asset Funding Company
Exxon Asset Management Company
Exxon Chemical Asset Management Partnership
Exxon Chemical France
Exxon Chemical Middle East Holdings Inc.
Exxon Chemical Paraffins Limited
Exxon Chemical Polymeres SNC
Exxon Chemical S.A.
Exxon Mobile Bay Limited Partnership
Exxon de Colombia S.A.
F.T. Giken Kabushiki Kaisha
Federated Pipe Lines (Western) Ltd.
Federated Pipe Lines Ltd.
Ferngas Nordbayern G.m.b.H.
Ferngas Salzgitter GmbH
Fernkaelte Geschaeftsstadt Nord G.b.R.
Flughafen Schwechat Hydranten-Gesellschaft
Fuji Kogyo K.K.
Full Cycle Plastics Pty. Ltd.
G16a (Groep) B.V.
GVOE Gebinde-Verwertungesellschaft der
Mineraloelwirtschaft
Gas Direct Limited
Gasunie Engineering B.V.
Gasunie Warmte/Kracht Emmen B.V.
General Bussan K.K.
General Highway K.K.
General Petrochemical Industries Limited
General Sekiyu K.K.
General Sekiyu Okinawa Hanbai K.K.
General Sekiyu Overseas, Ltd.
General Shipping Co. Ltd.
General Unyu Kabushiki Kaisha
George Lavera

Ges. fur Mineraloelveredlung und Distribution Rhaesa mbH
Gewerkschaft Brassert Erdoel und Erdgas GmbH
Gewerkschaft Gute Hoffnung Erdgas und Erdoel GmbH
Gewerkschaft Kuechenberg Erdgas und Erdoel GmbH
Glen Park Gas Pipe Line Company Limited
Grande Ecaille Land Company, Inc.
Great Lakes Response Corporation of Canada
Groupement Immobilier Petrolier
Groupement Petrolier Aviation
Groupement Petrolier de Nantes (G.P.N.)
Groupement Petrolier de Saint-Pierre des Corps (G.P.S.P.C.)
Groupement Petrolier de la Cote D'Azur
Groupement Petrolier du Finistere G.I.E.
Groupement Petrolier du Val-de-Marne (G.P.V.M.)
Groupement d'Exploitation du Depot de Reception de Chennevie
Guam Response Services Ltd.
Hambrecht & Quist Environmental Technology
Hamburger Gaswerke GmbH
Hannoversche Erdoelleitungs-G.m.b.H.
Hanshin Kyowa Sekiyu K.K.
Heinrich Schneider Spedition GmbH
Hiroshima General Gas Juten Kabushiki Kaisha
Hoei Sekiyu K.K.
Hokkai Sanshi Co., Ltd. (Chemical)
Hokuyu Sekiyu K. K.
Hong Kong Pumped Storage Development Company, Limited
Hong Kong Response Limited
Houston Regional Monitoring Corporation
Hydrant Refuelling System, S.A.
Hydranten-Betriebs-Gesellschaft, G.b.R.
Hydrierwerke Poelitz Aktiengesellschaft
Imperial Oil (an Ontario General Partnership)
Imperial Oil Limited
Imperial Oil Resources N.W.T. Limited
Imperial Oil Resources Ventures Limited

Imperial Oil Resources an Alberta limited partnership
Industria Acqua Siracusana S.p.A.
Industry Promotion Enterprises Limited
Iraq Petroleum Company, Limited
Japan Butyl Company Limited
Jersey Nuclear-Avco Isotopes, Inc.
K. K. Momose Shiojiri Stand
K. K. Toresen
K.K. Aizu General
K.K. Auto
K.K. Daimaru
K.K. Eastern Gas Terminal
K.K. General Gas Butsuryu Kansai
K.K. General Gas Butsuryu Kanto
K.K. General Sekiyu Hanbaisho
K.K. Genet
K.K. Genetech
K.K. Genex
K.K. Heian Sekiyu
K.K. Kyoei Shosha
K.K. Marugo Izumasa Shoten
K.K. Marutaka Sekiyu
K.K. Momose Sekiyu
K.K. Standard Sekiyu Osaka Hatsubaisho
K.K. Tama General
K.K. Toko
K.K. Uwano Sekiyu Shokai
K/S Statfjord Transport A/S & Co.
KX Industries, L.P.
Kabushiki Kaisha Sankyo Plastics
Kabushiki Kaisha Serubisu
Kai Tak Refuellers Company Limited
Kansai Chuo Sekiyu K.K.
Kanto Kygnus K.K.
Karlsruhe-Stuttgart Rohrleitung Gesellschaft mbH
Kawasaki Kygnus Sekiyu Hambai Kabushiki Kaisha

Keiyo Sekiyu Hanbai K.K.
Kemcor Australia Pty. Ltd.
Kemcor Elastomers Ltd.
Kemcor Olefins Ltd.
Kemcor Plastics Pty. Ltd.
Kent Gas Company Limited, The
Kenya Petroleum Refineries Limited
Kibo Sekiyu Hanbai K.K.
Kimura Sekiyu Kabushiki Kaisha
Kinwa Sekiyu K.K.
Kobe Standard Sekiyu K. K.
Korea Perchem Company Limited
Kosxon Chemical Company Limited
Kowa Sekiyu K.K.
Kumho E.P. Rubber Co., Ltd.
Kygnus Ekika Gas Kabushiki Kaisha
Kygnus Kosan Kabushiki Kaisha
Kygnus Sekiyu K. K.
Kygnus Sekiyu Seisei Kabushiki Kaisha
Kygnus Trading Kabushiki Kaisha
Kyushu Eagle K.K.
L-Net East K.K.
L-Net West K.K.
L12A (Groep) B.V.
L12B/L15B (Groep) B.V.
L14 (Groep) B.V.
L15A (Groep) B.V.
L2 (Groep) B.V.
L5a (Groep) B.V.
LEAG Aktiengesellschaft fuer luzernisches Erdoel
Les Docks des Petroles d'Ambes
Les Emulsions de Feyzin et du Dauphine
Liants Routiers de la Vallee de la Loire (LRVL)
Liants Routiers de la Vallee du Rhin (L.R.V.R.)
Liants Routiers du Gard (L.R.G.)
Lilac Sekiyu Kabushiki Kaisha

Lily Sekiyu K.K.
Lithcon Petroleum International (Bahamas) Inc.
Lithcon Petroleum Taiwan Inc.
MEGAL FINCO
MEGAL GmbH
Maasvlakte Olie Terminal C.V.
Maasvlakte Olie Terminal N.V.
Magota Sekiyu K.K.
Mainline Pipelines Limited
Malaysian Energy Chemical & Services Sdn Bhd
Manchester Airport Storage and Hydrant Company Limited
Marugo Gas K.K.
McCann Plastics Inc. (Chemical)
McColl-Frontenac Inc.
McColl-Frontenac Petroleum Inc./Petroliere McColl-Frontenac
Meiji Sekiyu K.K.
Mikawa Bussan K.K.
Mitake Unso K.K.
Mittelrheinische Erdgas Transport Gesellschaft mit beschrank
Mode Wheel Property Limited
Montreal Pipe Line Limited/Les Pipe-Lines Montreal Limitee
Mount Thorley Coal Loading Limited
Multi Tank Card B.V.
Mytex Polymers (General Partnership)
N. V. Nederlandse Gasunie
NAM - K 14 B.V.
NAM - K 15 B.V.
NAM - K 7 B.V.
NAM Pipeline B.V.
NAM-K17 B.V.
NAM/CLOMS - K 8/K 11 B.V.
NAM/CLOMS - L 13 B.V.
NAM/Mobil M9a B.V.
NPC Services, Inc.
Nakabayashi Sekiyu K.K.
Nalco/Exxon Energy Chemicals Argentina S.A.

Nalco/Exxon Energy Chemicals Brasil LTDA.
Nalco/Exxon Energy Chemicals Colombia S.A.
Nalco/Exxon Energy Chemicals Limited
Nalco/Exxon Energy Chemicals, Inc.
Nalco/Exxon Energy Chemicals, L.P.
Name: EDE
Name: IORL
Nansei Oil Terminal K.K.
Nansei Sekiyu Kabushiki Kaisha
Nanseki Kaihatsu K.K.
Near East Development Corporation
Nederlandse Aardolie Maatschappij B. V.
Netra AG
Netra GmbH
New Cure, Inc.
Newcastle Coal Shippers Pty. Limited
Nichiei Kogyo Kabushiki Kaisha
Nichimo Oil (Bermuda) Co., Ltd.
Niedersaechsische Energie Agentur GmbH
Nikko Sangyo K.K.
Nippon Unicar K.K.
Nissei Sekiyu Kabushiki Kaisha
Nogat B.V.
Norddeutsche Erdgas-Aufbereitungs G.m.b.H.
Norddeutsche Mineraloelwerke Stettin G.m.b.H.
Nordrheinische Erdgas Transport Gesellschaft mit beschrankte
Noroxo
Northward Developments Ltd.
OSLO Alberta Limited
Office Prive d'Assurances et de Courtages
Oil Field Chemicals Company (Saudi Arabia) Ltd.
Oil Spill Holdings Private Limited
Oil Spill Response Limited
Oldenburgische Erdoel Gesellschaft m.b.H.
Osaka General Gas K.K.

Osaka Kygnus K.K.
P.A.C. S.A.R.L. (Pinson-Allegret-Causse)
Pacesetter Enterprises Limited
Pars Investment Corporation
Petrosvibri S.A.
Plantation Pipe Line Company
Port-Jerome Gaz (P.J. Gaz)
Portland Pipe Line Corporation
Primaeroel GmbH
Prince William Sound Oil Spill Response Corporation
Progas Limited
Projectbureau W/K B.V.
Q16a (Groep) B.V.
Quadrant Gas Limited
Raffinerie du Midi S.A.R.L.
Rainbow Pipe Line Company, Ltd.
Redwater Water Disposal Company Limited
Refineria Petrolera Acajutla, S.A.
Regulus Holding (Singapore) Pte. Ltd.
Rexplas Sdn Bhd
Rheingas Erdgasleitungs-Gesellschaft m.b.H.
Rotterdam Antwerpen Pijpleiding (Belgie) N.V.
Rotterdam Antwerpen Pijpleiding C.V.
Rotterdam-Antwerpen Pijpleiding (Nederland) N. V.
Rubiatec Sendirian Berhad
Ruhrgas Aktiengesellschaft
S.A. du Pipeline a Produits Petroliers sur Territoire Geneve
SEAG Aktiengesellschaft fuer schweizerisches Erdoel
SERAM S.p.A.
SOVEXOIL Oil Field
Saitama Sekiyu Hanbai K.K.
Sanyo Sekiyu K.K.
Saraco S. A.
Saudi Arabian Lube Additives Company Limited
Schubert K.G.
Senboku Oil Kikoh K.K.

Service Aviation Paris (S.A.P.)
Shehtah Drilling Limited
Shimizu LNG K. K.
Shimoyama Sekiyu K.K.
Shin-Nihon Yukagaku Kogyo K. K.
Shinohara Oil K.K.
Singapore Aromatics Company Private
Smiley Gas Conservation Limited
Sociedad Nacional de Oleoductos Ltda.
Sociedad de Inversiones de Aviacion Limitada
Societa Italiana per l'Oleodotto Transalpino S.p.A.
Societa per Azioni Raffineria Padana Olii Minerali-SARPOM
Societe "Geomines-Caen"
Societe Anonyme "Produits Lubrifiants de Madagascar" — PROLU
Societe Anonyme de Gestion de Stocks de Securite (SAGESS)
Societe Anonyme de la Raffinerie des Antilles
Societe Anonyme des Hydrocarbures
Societe Civile de Mustapha Algerie
Societe Civile de Participation pour la Destruction des Dech
Societe Esso de Recherches et d'Exploitation Petrolieres Ess
Societe Francaise EXXON CHEMICAL
Societe Havraise de Manutention de Produits Petroliers
Societe Malgache de Raffinage
Societe Paris-Manche
Societe Paris-Niel
Societe Reunionnaise d'Entreposage
Societe d'Etude et d'Exploitation de law Raffinerie du Tchad
Societe d'Exploitation & de Developpement d'Operations Comme
Societe d'Exploitation des Garages Les Stations Tour Eiffel
Societe de Manutention de Carburants Aviation (S. M. C. A.)
Societe de Promotion et de Financement Touristique (CARTHAGO)
Societe de la Raffinerie d'Alger
Societe des Pipe-Lines de Strasbourg

Societe des Transports Petroliers par Pipe Line
Societe du Caoutchouc Butyl (SOCABU)
Societe du Pipe Line de la Raffinerie de Lorraine
Societe du Pipe-Line Mediterranee-Rhone
Societe du Pipeline Sud-Europeen
Southern Natural Gas Development Pty. Ltd.
Sriracha Power Company Ltd.
Standard Kaihatsu K.K.
Standard Service K.K.
Stansted Fuelling Company Limited
Statfjord Transport A/S
Sucre Gas, S.A.
Sueddeutsche Erdgas Transport Gesellschaft mit beschrankter
Sun East (Dublin) Company, Ltd.
Superior Disk Corporation
Surrey Gas Company Limited, The
Sussex Gas Company Limited, The
Syncrude Canada Ltd.
TAR-Tankanlage Ruemlang AG
TBF Tanklager Betriebsfuehrungsgesellschaft m.b.H.
TBN Tanklager-Betriebsgesellschaft Nuernberg mbH2
TCA Plastics Inc.
TEAM Terminal B.V.
TFS Turbo Fuel Services GbR, Hamburg
TGF Tankdienst Gesellschaft Frankfurt G.b.R.
TGM Tankdienst-Gesellschaft Muenchen GbR
TIBA Speditions GmbH
TLS Tanklager Stuttgart GmbH
Taihei Bussan K.K.
Taisei Kogyo Sekiyu Hanbai K.K.
Taketsuru Yugyo K.K.
Tankanlage A. G., Mellingen
Tanklager Altishausen A. G.
Tanklager Taegerschen AG
Tanklager-Gesellschaft Tegel G.b.R.
Tanklagergesellschaft, Koeln-Bonn G.b.R.

Tecnica Quimica Petrolera, S.A. de C.V.
Terminal Petrolier de Bordeaux (T.P.B.)
Thai Aliphatics Company Limited
Thai C-Center Company Limited
Thai Petroleum Pipeline Co., Ltd.
Thyssengas G.m.b.H.
Tohpren Co., Ltd. (Chemical)
Tojo Gas K.K.
Toko Sekiyu K.K.
Tonen Chemical Nasu Co., Ltd.
Tonen Energy International Corp.
Tonen Energy and Marine (singapore) Pte. Ltd.
Tonen Filare Co. Ltd.
Tonen Film Company Limited
Tonen Kabushiki Kaisha
Tonen Kagaku K.K.
Tonen Properties Inc.
Tonen Sogo Service Co., Ltd.
Tonen System Plaza Kabushiki Kaisha
Tonen System Service Kabushiki Kaisha
Tonen Tanker Kabushiki Kaisha
Tonen Tapyrus Company Limited
Tonen Technology K. K.
Tonex Company Limited
Towa Compounding Co., Ltd.
Towa Sekiyu K.K.
Toyoshina Film Company, Ltd.
Trans-Northern Pipelines Inc.
Transalpine Oelleitung in Oesterreich Gesellschaft m.b.H.
Tsurumaru Unyu K.K.
UBAG — Unterflurbetankungsanlage Flughafen Zurich
Ulan Coal Mines Limited
United Industry Development Co., Ltd.
Van Salt Water Disposal Company
Verbundnetz Gas AG
Wako Jushi Kabushiki Kaisha

Westdeutsche Erdoelleitungs—G.m.b.H.
Western Canada Marine Response Corporation
Westgas G.m.b.H.
Worex S.N.C.
Yasaka Sekiyu K.K.
Yellowstone Pipe Line Company
Yoshimi Gas Kabushiki Kaisha
Yuai Sekiyu K.K.
Zenon Environmental Systems Inc. (ZESI)